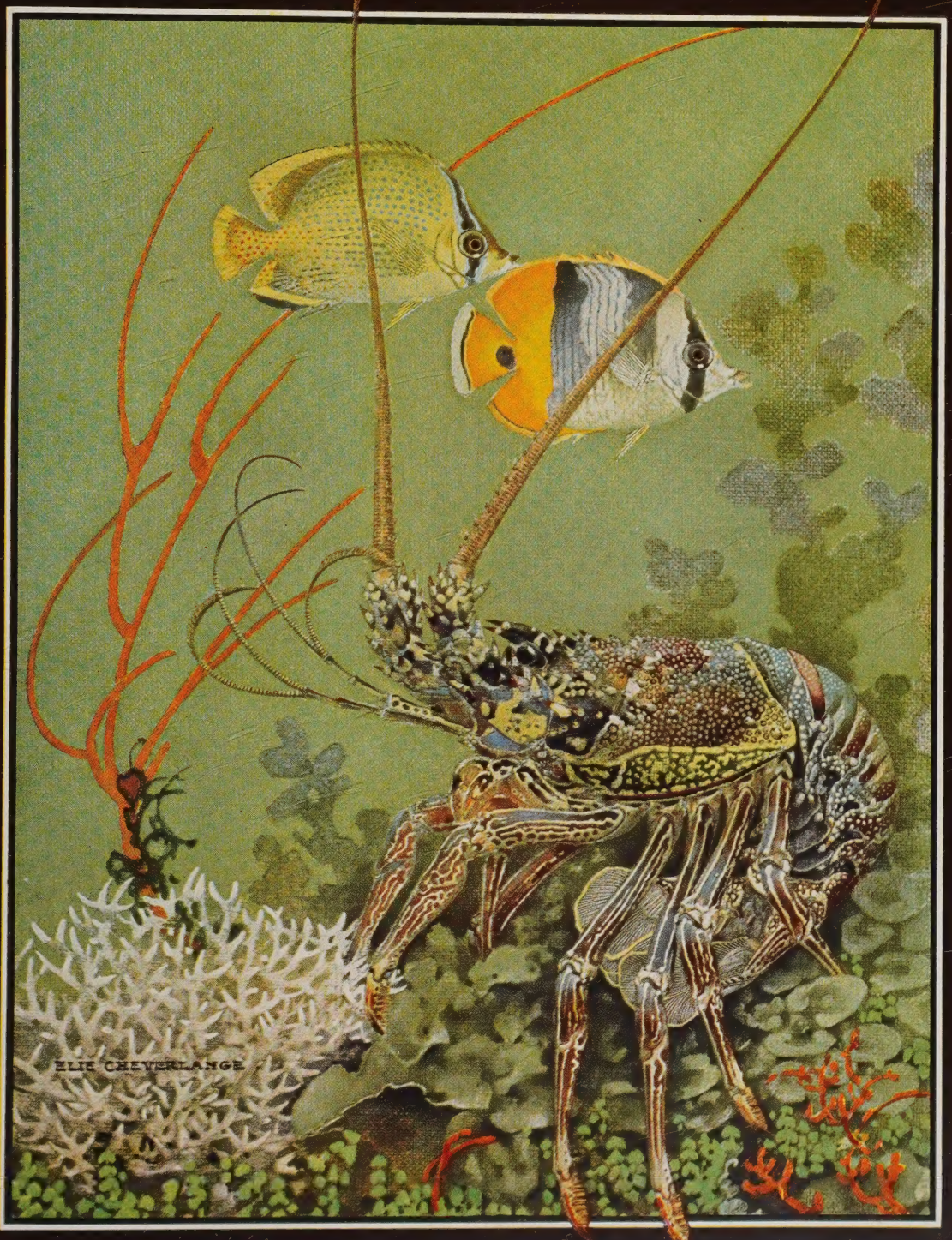
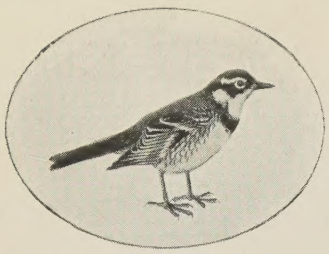
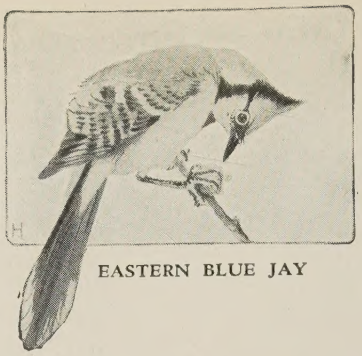
NATURE MAGAZINE



SEPTEMBER 1930 35¢ VOL. 16, NO. 3

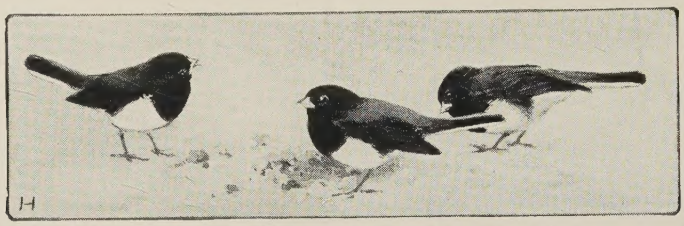


VARIED THRUSH



EASTERN BLUE JAY

THE CHEWINK



SNOW BIRDS OR JUNCOS

BIRD AND ANIMAL PAINTINGS

By R. Bruce Horsfall

SPECIAL LIMITED EDITION NOW AVAILABLE IN CONVENIENT FORM

MANY readers of Nature Magazine have asked when the beautiful color pictures of birds, mammals and insects that have appeared in Nature Magazine would be available separate from the Magazine. The demand has been so insistent that this is the result:

A beautifully printed book containing 168 pictures in full colors, three and one-half by two and one-half inches, and a beautiful frontispiece has been printed and is now available.

Each picture is accompanied by concise description of the character and habits of the subject.

Helpful suggestions are included to show the use of the book for school, camp, home and other educational purposes.

Despite the high cost of color plates and printing all this will cost the readers of Nature Magazine,—

ONLY ONE DOLLAR

American Nature Association
1214 Sixteenth Street, Washington, D. C.

Enclosed please find $ ..... for ..... books of R. Bruce Horsfall's Bird and Animal Paintings.

Name .....

Street Address .....

City .....

State .....

Please make address complete and legible

Playing Possum

Elsewhere in this issue Mr. Frank Bond escribes his experiences with catbird young. vidently catbirds the world over are alike, witness the experience of Miss Esther E. rice:

"A pair of catbirds, seemingly the same rds, have nested with us for some years. Ve find them most diverting acquaintances, we are allowed to figure somewhat in eir daily doings.

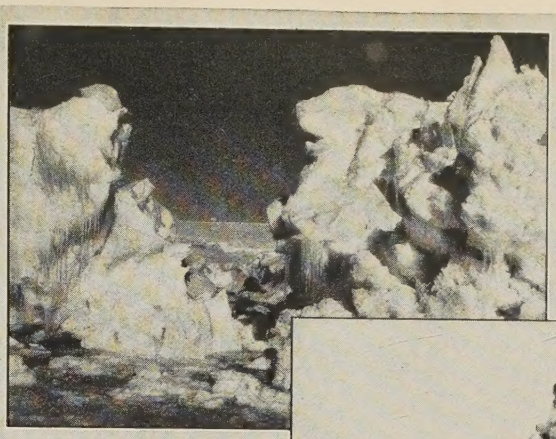
"The catbird babies are over-ambitious and re to give the cautious parent birds a renuous few days when they aspire to reak the home ties'.

"One youngster, unable to fly, having but e slightest hint of a tail and showing bare ots, hopped about on the ground all day. e took no heed of parental advice, but ersisted in advertising his helplessness and xposing himself to all the evils that befall rd babies. One day, toward evening, a eavy storm threatened. The parents wor-ed. The self-willed birdling cuddled under e projection of the porch steps in the rip from the roof for the night, and should e escape the cats he would have drowned. rovidence in the person of the observer me to the rescue. I put my hand upon him, d, with one weak, verbal protest, he osed his eyes and lay limp in my grasp. stonishingly different was he from the bin fledgling that cries piteously and ruggles to distraction. I carried the 'err-g infant' to the grape arbor nearby, and aking sure his toes clasped a small vine, osened my fingers gently. I prepared for scramble, expecting him to slip from me nselessly as do robin babies. But, no! e little body, apparently dead, remained mp, without a quiver, eyes closed, resting on a stringer of the arbor, his toes about e vine. Poor little fellow! I thought him hausted, unable to withstand the strenu-us happenings of the day, and gone beyond covery. I hurried away, for it was raining rd.

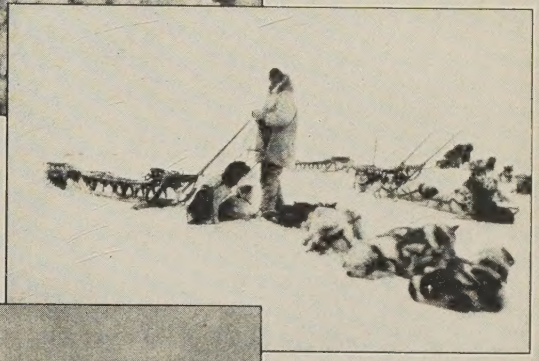
"Feeling sorry, I went to investigate ten inutes later. He was gone. He could not found in the grass where I searched dili-ntly. I peered about the vines, and finally, ehold, there he sat, six feet from the for-er place, under an umbrella of leaves. Very uch alive, thank you. Upright, sparse athers fluffed, eyes bright and fearless, ipper as you please, laughing at me, I rily believe. He had surely 'possumed'."

Radioed Nature

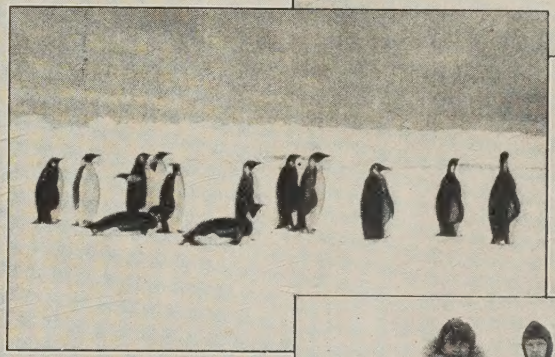
Over the Columbia radio network at 30 each Friday afternoon this summer ill come an all-Nature program, designed rticularly for summer camps, and prepared Dr. Bertha Chapman Cady, secretary of e Coordinating Council for Nature Activi-s. The period is turned over to what is own as the Columbia Nature Club, spon-red by the Columbia Broadcasting Cor-ration. All phases of Nature lore will covered in the broadcasts, including bird, e, flower, animal, insect and shore life, rs and rock formations, and the talks ll follow closely the publications issued by e National Council so that interested teners may use the texts to amplify the oadcast lessons. This is the first nation-de broadcast of Nature of which we have ard and we hope that every Nature-mind-person will tune in, to give support to a luable idea.



65° below in Little America—but Graflex Cameras got the pictures



Strange lighting—restless dogs—required Graflex direct focusing hood to eliminate all guess work



"The Penguins' Reception Committee" posed for Captain McKinley's Graflex

Graflex enabled Byrd, Gould and McKinley officially to picture the entire story of their thrilling adventures

Nine out of every ten of the several thousand official Byrd Expedition still pictures were taken with Graflex

Graflex, the official still camera of the Expedition, justified its selection .... even in the intense Antarctic cold not a single Graflex froze up.

The CAMERA For *Important* Pictures

GRAFLEX

FOLMER GRAFLEX CORP. ... ROCHESTER, N.Y.

FOLMER GRAFLEX CORPORATION, *Dept. 73*, ROCHESTER, N. Y. Please send to name and address on margin, "Why a Graflex" which tells how more interesting pictures are made with Graflex—the *official* still camera of the Byrd Antarctic Expedition.

Off to School

Story-Telling Pictures of Children

FORTUNATELY we are gradually getting away from the old idea of standing little Betty Jane in front of a clapboarded fence and snapping her picture after having straightened out her frock, fixed her hair just so and then urged her to "look at the birdie and smile." What little plaster images and camera-conscious expressions we got from such proceedings. How much better to let the tiny tots do their own posing or, better still, have no posing at all but catch them at play—natural, care-free—apparently unaware of the camera. It is then that we secure gems of portraiture.

What a priceless record we can secure in pictures of our children—the only *sure* way of recalling *just* how they looked when in mother's arms—at toddling days, school age and so on. While we will want many pictures in which we have caught close-up images, in which the spontaneous play of features show, we also can make our children's picture biographies of greatest interest by including many story-telling studies.

Pictures of the youngsters engaged in their everyday activities will help to make up an album or a movie reel to which our friends will give more than just a polite glance. The story will be graphic, "living," real—natural. The difference between an ordinary picture and a story-telling picture is that one records simply the likeness of the thing or person while the other tells at a glance the story of what is going on or what the person is doing. In the latter, it is not even necessary that any features show. In a story-telling picture, the portrait element is not only secondary to the story but the picture can tell a story without even showing the face of the subject as is evident by the picture titled "The Runaways."

We shall not have room to give technical pointers but if you write to us of your interest, we will be glad to send to your address a very helpful and informative booklet on making interesting pictures of children. The booklet is chock-full of charming child studies and complete data is given as to how the pictures were made. This is, by far, the best thing of the kind for the amateur that we have ever seen. The booklet is free on request to this department.

The Runaways

EDITED BY ROBERT T. LOWELL

Distant Views

Arthur Newton Pack's article "The Halls of Zion" in the July issue of Nature Magazine was illustrated with remarkably good photographs, some showing distant views of the canyons. Many amateurs fail to get good pictures of such scenic wonders and to those who carry along their cameras when they next hit the trails we give the following information.

The problem to solve in distant landscape work is the securing of contrast between the tones. The farther away the subject is the less contrast will there be between tones in the picture.

Since nearby objects always look larger than far distant objects, their shadows, which appear as dark tones in contrast with lighter ones, will be more prominent, and add more contrast to a picture, than the shadows of far distant objects.

The atmosphere also affects the securing of contrast. The air usually contains particles of dust and more or less water vapor.

Now the light waves which are scattered by the particles are chiefly the shorter waves,

Without Filter

With G Filter

that is, the blue-violet, and especially the ultra-violet. If we remove the shorter light waves, therefore, we shall get rid of most of the scattered light and can take the picture by the green, yellow and red rays which penetrate the haze and are not scattered by it. The shorter light waves are absorbed by a Kodak Color Filter, which cuts out the ultra-violet and violet rays so that the scattering effect is largely eliminated. Still more contrast can be secured with a Wratten K2 Filter.

For photographing far distant snow-capped mountains against a clear sky, or other very distant scenes in which strong contrast is wanted, a Wratten G Filter should be used.

In photographing distant landscapes we must be careful not to over-expose the film, because over-exposure reduces the contrast between the tones.

One-fiftieth of a second through stop 16 is ample for a distant landscape when the sun is shining. The writer has obtained satisfactory results when using stop 16 by giving a 1/10 second exposure with the Kodak Color Filter, a 1/5 second exposure with the Wratten K2 and a 1 second exposure with the Wratten G Filter.

Fascinated

Concerning Submarine Photography

WE received a letter of appreciation from a reader who asked for information on how to make photographs of fishes in their natural habitat. It was, to be sure, a "big order" but a little research and some of our own ideas seemed to please the inquirer, as he writes:

"I wish to send a word of thanks for the helpful letter relative to taking pictures under water. I wrote to a number of places and your reply was by far the most helpful."

He adds:

"The reason that I have become excited about this is that I found chub-shiners also red-horse mating and laying eggs and I tried so hard to take pictures of them by ordinary methods with no luck. As far as I can see there has been little or nothing done to show the round of life of our common fish. All I have seen of that type of thing has been of a spectacular nature, showing unusual things and tropical fish."

If you have had any experience in this kind of work we would be glad to know about it. If you should like a copy of the data we got together, just drop us a line.

Ciné Hints

If you have just recently been initiated into the brotherhood of motion picture camera owners these notes may not go amiss.

An expert and an old timer in the game warns against "spraying the landscape;" that is, trying to get "all creation" into a few feet of film while turning or panoraming the camera. When the movie camera is "panned" it should be done slowly—very slowly—and steadily and not too great an area covered. For very best results a tripod with a special panoraming head attachment should be employed. The tripod will also be an aid in getting clear flickerless screen pictures when using a long focus or telephoto lens. Its solid support prevents body weave.

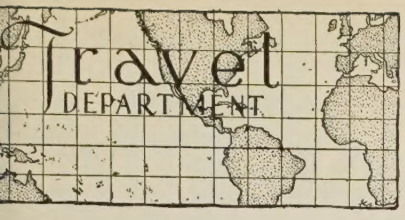
The telephoto lens is a valuable accessory especially to the Nature picture seeker.

Panchromatic film and recommended filters, for slipping over the regular lens, will record the clouds and bring striking pictorial effects in scenic subjects.

Now Duty Free!

By the terms of the act recently passed by Congress amateur 16 mm. motion picture films taken abroad and exposed may now be brought in duty free whether developed or not, provided they are of American manufacture and are not used commercially. This is the result of three years intensive effort by the Amateur Cinema League.

Complete details will be sent on request.



Edited by
ELEANOR WALKER

Caribbean Snapshots

Doesn't the word "tropics" suggest to you omething far off in space and experience? et in a few days from New York you may e in the land of mango groves and liana nes, of banana tracts and coffee fincas, of atched hut villages and naked brown ibies.

It is moonlight in Havana. The gleaming panish houses of all hues, yellow, laven-er, pale lime, orange, pink and blue, softly inbow the night. Whether in West Indies Central America, the Latin-American par-r is usually flush with the street, and as ou stroll along you can scarcely help but e family life in a score of Cuban homes. y day Havana is more glaring. The sun azes, shrieking taxis and the cry of ped-ers rend the air with noise. Even the base-ll games, one of Cuba's favorite sports, e vociferous with the constant betting yell-out on every play. For gambling is in every atin American's blood from the society eople, who frequent the Casino evenings in ll dress, to the ragged peasant who buys ticket from the state lotteries.

At the opposite end of the island is Santi-go, even more colorful than Havana, built it is in steep terraces clambering up the llside. And in the wide spaces in between e the sugar centrals, the coffee plantations, e villages of palm leaf huts and here and ere a mine. These are the most interesting aces in Cuba.

Some of the Cuban towns still practice e custom of a Sunday evening turnout on e plaza, where everyone from the highest the lowest passes in review. This is about e only time you see the women in public— d here they march, well chaperoned, often deep as six in a row, in the opposite di-ction from the male aggregations.

More than one hundred years before the ayflower was even built or the Dutch had rted to settle New Amsterdam, the Euro-ans, chiefly the Spanish at first, were bucca-ering among these Caribbean lands, exter-nating or assimilating the native Indian ock, and importing hordes of African ne-oes to be their slaves. Later the French and e English, the Dutch and the Scandinav-ns joined in this "snatch-as-you-can" game, th the result that today the white blood the European colonials has been frequent-crossed with that of African or Indian. ere are still pure whites, of course, in tain sections. The Indians, as in uatemala, and the negroes, as in Jamaica, also pure-blooded, but the majority is vast conglomerate, always interesting and metimes, when you get a wide variety hue, as in a third class railway train, ually a beautiful study in brown chromos. though the islands generally are either otectorates or colonies of the United tes or Europeans, the languages or ois used derive from their original con-querors. The Americans are in control of Haiti, for example, and yet the uneducated native cannot speak a word of English.

The worm occasionally turned on these swash-buckling pirates. Centuries ago in Haiti the African slaves staged their own French revolution, driving their French masters off the island forever; and on an unbelievably inaccesible mountain in northern Haiti they erected the palace and citadel of San Souci for their black emperor, Henri Christophe. The ruins today are one of the

(Continued on page 136)

Nature Magazine will take a party to this Caribbean land this winter. A brief announcement of the trip appears on Page 147 of this issue. The October number will contain information in greater detail, but those interested in a winter vacation should write to this department for information on the Nature Cruise to the Caribbean.

Here's the Microscope for You!

300-POWER, $18.00

A drop of ditch water reveals a world of amazing living things. A fly's eye becomes a gem of gorgeous beauty. A butterfly's wing presents glories that even Aladdin never saw.

Let This
New Gem Microscope
Open the Door of Fairyland

This new Gem Microscope is a high grade scientific instrument made by the factory that produces America's finest microscopes for famous scientists. Its draw tube and double objective lens magnify 75 to 300 times, showing wonders formerly visible only with costly research microscopes. Base can be detached for viewing large opaque objects.

With the New Gem *Science Kit* you can make your own microscope slides; contains complete equipment for all Amateur Microscopy. Separately, $12. Kit and microscope together only $28.50. See this wonderful New Gem Microscope at any good optical store.

Note the impressive appearance of this New Gem Microscope.

BAUSCH & LOMB
OPTICAL COMPANY
732 St. Paul Street, Rochester, N.Y.

For Better Vision » » Orthogon Eyeglass Lenses

WOODS ARCTIC DOWN SLEEPING ROBES

A Good Day—
a Better Night!

You'll get your SLEEP!

BETWEEN the world and you and a good mulligan stew, your Woods Arctic Down Sleeping Robe is an incomparable comfort after a hard day's hunt. Wherever you crawl in—from Northern tundra to Southern sand waste, from mountain cabin to sawgrass hut—you are sure of campfire comfort all night without fire.

Your Woods Arctic Down Robe adjusts itself to all weather. It is self-regulated by Nature's best method, in Woods Everlive Down interlining, from Northern waterfowl.

Rainproofed windbreaker-fabric cover. Pure virgin wool kersey or army flannel lining. Lift-the-dot fasteners. Maintains uniform body-heat comfort without changing covers. Famous for extreme range of temperature accommodation.

Arctic 78" x 84", 14 lbs., $58.50; Arctic 90" x 90", 15½ lbs., $67.50. Arctic Junior 78" x 84", 8½ lbs., $46.50; Arctic Junior 90" x 90", 10 lbs., $57.00. Woods Wool Batt Robes, 72" x 84", 8½ lbs., $20 and $26.50.

Sold by leading dealers. If not displayed, please write us. New descriptive folder and prices FREE.

WOODS MANUFACTURING CO., LTD. 3012 Lake St., Ogdensburg, N. Y. In Canada, Ottawa, Ont.

say "THE STATLER" and be SURE

When the taxi driver asks, "Where to, sir?" tell him to drive you to The Statler — there your satisfaction is guaranteed.

You can be *sure* of finding employees who are *trained*, courteous and helpful — who go out of their way to give friendly, interested service.

You can be *sure* of excellent food in attractive, well-managed restaurants. You can be *sure* of fixed, unchanging rates posted in every room, a radio, your own private bath, circulating ice-water, a morning newspaper under your door, a bed-head reading lamp and many another thoughtful comfort to make your stay pleasant.

And you'll appreciate the certainty of getting *all* these things in *every* Statler — whenever you are a Statler guest.

HOTELS STATLER

BOSTON DETROIT
BUFFALO ST. LOUIS
CLEVELAND NEW YORK
[Hotel Pennsylvania]

TRAVEL DEPARTMENT

(Continued from page 135)

greatest monuments of America and from this site, the view of sea, of green mountains and deep valleys is gorgeously panoramic.

Although Port-au-Prince, the capital of Haiti, has paved streets and automobiles, street cleaners and a railroad, and although many Americans live luxuriously there and many well-educated natives would be homesick anywhere else, it is the African aspect of the town that leaves the most vivid impression. The big market opens at dawn on Saturday morning. One day an American leaning against the arch of triumph counted, in one hour, thirty thousand travelers coming in from the country, all except about two hundred of them being market women, barefooted, carrying on their heads their baskets of tropical fruits, of hand woven saddle bags, of casava bread in sheets, of cinnamon bark or red Jamaican berries used for beads. Occasionally one rode in state on top of a donkey load of merchandise. All of them wore gay bandanas underneath broad palm leaf hats.

May we merely mention other Antilles? Jamaica, with a "hot" reputation for ginger and rum, has beautiful drives, notably the one from Kingston to Port Antonio. Porto Rico has a maximum of scenery in a minimum of space with excellent highways throughout. Everywhere you will see the work done by negro women, even to the coaling of war vessels.

Along the west coast of Central America stretches the Cordillera mountain range, with its lazily smoking volcanoes, its indescribable vistas of valleys and plateaus below, and its endless trails through the dense vegetation of the mountain tropics, along which constantly streams up or down the barefooted peasants, afoot or horseback, going to or from the market. These mountain climbs with an occasional visit to coffee *finca* or native village are far more interesting than the cities of Central America, and are usually fairly accessible from port or capital.

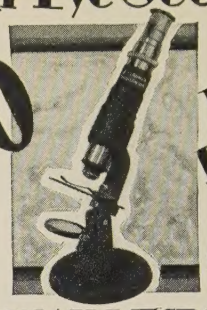
We have space merely to mention each republic. Costa Rica is the most grown-up and Guatemala the most scenic. Salvador has the best army and Honduras exports the most bananas. Nicaragua came near getting the canal because of its wide lake.

In many a remote spot of these republics you will find an English, American, or German owner of a sugar plantation or coffee *finca*.

A coffee *finca* is a veritable heaven. Situated on some volcanic slope, it provides a gorgeous view of valley and peaks, with a nearer sight of orange and lemon groves. The owner's house is always commodious, frequently built in Spanish style around a patio, with a wide three-sided corridor off which open enormous rooms that are beautifully frescoed and floored with Spanish and Italian tiles. Tennis courts and sometimes golf courses are attached to the estate, also the houses of the workers, often for as many as two hundred families.

Special mention should perhaps be made of Guatemala because its central plateau is in one of the most beautiful valleys in the world, and from there you can easily get west to that crater lake, Atitlán, with its border of volcanic peaks. More than half the

"Your Eye Sees It — 250 Times Larger"



MADE IN U.S.A.

WOLLENSAK MICROSCOPE $16.50

SOLVE the mysteries of insect, plant and mineral life with the Wollensak Microscope. Reveal to yourself the beauties of nature hidden from the unaided eye. One of these fine microscopes should belong to every student, dentist, physician, or scientist and should be part of the equipment of home, office, school, or laboratory. *It gives a range of magnifications from 100 to 250 diameters in steps of 25.* Elaborately finished tilting stand, nickel trim, plush lined case, prepared slide, complete instructions. Ask your dealer, or, we will send you one postpaid. *Money back guarantee.* Lower powered Wollensak models $2.50 to $8.50. Catalog free.

WOLLENSAK OPTICAL COMPANY
862 Hudson Avenue Rochester, N.Y.

POCKET NATURE GLASSES

MIRAKEL OPT. CO. DAYLUX BINOCULAR

$35 Pocket. 150 yards field, 10 oz. weight

$5.25 to $68; 3 to 8 power
3 to 12 ounces in weight. New and used glasses of all makes.

Satisfaction guaranteed; sent postpaid on approval upon receipt of your bank reference. We carry everything in glasses up to 24 power. State price you wish to pay and save correspondence.

J. ALDEN LORING
Box K-1 Owego, N. Y.

Magic Eyes $7.95

15-25 Miles

8 Lenses **Magic Eyes** that will extend your vision over 15 to 25 square miles. See the multitude of things these powerful lenses will show you. They conquer distance and bring distant objects before your very eyes. Wonderful for hunters, naturalists, tourists, etc.

Only 8 Lens Galilean Binocular Under $30.00
Eight fine sparkling precision ground day and night lenses. No wonder they give crisp clear cut details expansive field and great range. Only 4 3-8 in. high. Fine compass on top. Graduated focusing scale 1 to 12 on middle bar. Case and straps free. Order one today while they last. Only $7.95 C. O. D. Free Trial for five days. Money back if you want it.

CATALOG Over 200 Glasses All Makes $1-$110

TRIAL FREE

Everything in binoculars, field glasses, telescopes and optical instruments. The finest and largest assortment in America. Catalog gives all information how to choose the best for your individual needs at the LOWEST PRICE.

Try America's Leading Binocular House First

DuMaurier Co. Dept. 89 Elmira, N. Y.

Realistic Terra Cotta Frogs

$1.50 to $25.00—"They Float"

TERRA COTTA GARDEN ORNAMENTS IN NATURAL COLORS · GNOMES · DWARFS · WOODLAND AND GARDEN CREATURES · TOADSTOOL GARDEN SEATS. Song Birds in Natural Colors for Bird Baths, etc. $1.50 Each.

Profusely Illustrated Catalog sent upon Receipt of $1. Refunded When Returned.

F. B. ACKERMANN
50 Union Square IMPORTER New York

A Big Future in Commercial ART

Successful commercial artists are just ordinary men and women who liked to draw, found out they had talent, and developed it. If you like to draw, you have the same opportunity as they. Take our Free Art Test now and find out if your talent is worth developing. The Federal School course trains you quickly and thoroughly. Many Federal Students, women as well as men, are earning $50, $60, $75, and $100 a week—some even more. Write for Free Art Test now.

Federal School of Commercial Designing
1921 Federal Schools Building, Minneapolis, Minn.

Learn to be a— LANDSCAPE ARCHITECT

At Home—By Mail

Big fees; pleasant healthful work; a dignified, uncrowded profession offering remarkable opportunities. Immediate income possible, many students more than pay for course from fees earned while studying. Graduates are earning $50 to $200 a week. The first step toward success is to write today for details.

AMERICAN LANDSCAPE SCHOOL
Member National Home Study Council
21 Plymouth Bldg., Des Moines, Ia.

COLLEGE COURSES AT HOME

Carry on your education. Develop power to initiate and achieve. Earn credit toward a Bachelor degree or Teaching Certificate *by correspondence.* Select from 450 courses in 45 subjects, including English, Mathematics, History, Education, Psychology, Economics, the Languages, etc. Write for catalog.

The University of Chicago
523 ELLIS HALL CHICAGO, ILL.

Learn Photography at HOME

ake money taking pictures. Prepare quickly during are time. Also earn while you learn. No experience ecessary. New easy method. Nothing else like it. nd at once for free book, *Opportunities in Modern hotography,* and full particulars.
AMERICAN SCHOOL OF PHOTOGRAPHY
ept. 1606, 3601 Michigan Ave. Chicago, U. S. A.

WESTWARD HO!

with the American Nature Association to the National Parks in 1931

Plan next year's vacation *Now!*

You must see Glacier, Yellowstone, Grand Canyon, Jasper Park, Canada and other scenic areas.

See them as the Association, with successful years behind it, can show them to you. Parties limited in size; a Naturalist to explain and inform; a conductor to assume all travel worries; and LOW COSTS!

Write today to have your name listed for receipt of the 1931 "On Western Trails."

AMERICAN NATURE ASSOCIATION
1214 16th St., Washington, D. C.

population of Guatemala is still pure Indian, and at Querigua may be seen the carved altar stones and columns of the Mayans.

There are in all the republics many trips to volcanoes through mountain tropics, as well as visits to banana, sugar and coffee plantations and to an occassional mine.

Magic Island, by W. S. Seabrook, is one of the most fascinating books ever written and refers specifically to Haiti. *Roaming through the West Indies* by Harry Franck is especially good on the islands and *The Central Americans* by Austin Ruhl is excellent on the republics. There are other well known historical and political discussions: Dr. Dana Munro's *The Five Republics of Central America,* Samuel Crowther's *The Romance and Rise of the American Tropics* and Chester Lloyd Jones' *Caribbean Interests of the United States.* For a regular guide-book, Baedeker style, get Harry L. Fosters' *The Caribbean Cruise. Beneath Tropic Seas* by Wm. Beebe describes the sea life near Haiti.

Golf Club Sanctuaries

To most golfers a "birdie" is a romantic idea, to be dreamed about and hoped for, but rarely executed. The National Association of Audubon Societies makes a very valuable suggestion that will, if executed, bring more "birdies" to every one of the eighteen holes. The Association, in an attractive booklet filled with pictures of the birds commonly found near golf links, recommends that clubs make their grounds bird sanctuaries, thus providing refuge to the creatures that devour the worms that spoil the greens and the insects that climb in your shoes as you are about to pitch to the pin. This proposal is a most excellent one. Many species find the cover of the rough or woodlands ideal for nesting. Food abounds in the fairways, and the water hazards supply bathing facilities. With little expense a bird sanctuary committee selected from the golfers could keep enemies of birds away and build bird baths and feeding stations, plant food-bearing trees and vines, and thus attract a feathered multitude that would in no way interfere with golf. A sanctuary is a resource and benefit to the community and a source of instruction to children. We hope that the clubs will take seriously the valuable suggestion of the National Association of Audubon Societies, so that the slogan "every golf links a bird sanctuary" may become true.

More Park Naturalists

So great has been the demand upon the naturalists of Glacier National Park during the past two summers that the Naturalist Service has more than doubled its personnel. Until last year, three temporary naturalists bore the burden of all the questions visitors could think up; last year, a permanent park naturalist and an additional temporary naturalist were added; but this year the staff is increased to seven men. They will be stationed at Many Glaciers Hotel, Going-to-the-Sun Chalets and Lake McDonald Hotel, Two Medicine and Avalanche Creek camp grounds, and will rotate occasionally through the other chalets. The head of the Service is Dr. G. C. Ruhle, whom members of last and this years' Nature Magazine trips remember with so much affection.

Hold School in Your Own Home

Those eager, seeking years when youthful minds are groping . . then is the time to start the child aright, laying a sound foundation for the future. Children of this age are too young to bundle off to a distant school. Many mothers have found a better way . . . a school that comes to them in the pleasant surroundings of their own homes

Calvert specialists in child training have arranged interesting courses to be given in the home . . . eliminating wasted effort . . . appealing to the child in terms he understands . . . cleverly intermingling composition, nature lore, rudimentary art with the three "R's." Thousands of mothers who want the best for their children, mothers who desire to keep their children at home during early school years, are training them this better way

Gaining Real Culture

One happy mother writes: "Our small daughter is unfolding beautifully under your system of education. She is becoming well grounded in fundamentals and acquiring a general fund of knowledge. Instead of working to pass examinations, she is gaining real culture. It is a marvelous foundation for further building

No Teaching Experience Necessary

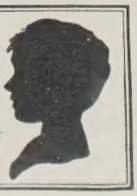
You'll enjoy the delightful intimacy of mother and child that these Calvert Courses foster. No previous teaching experience is necessary. Follow from day to day the explicit instructions. Lessons can be finished by noon. All afternoon remains for healthful romp and play. Your little ones are safe from flying death in streets . . . away from crowds and the menace of contagious diseases. On rainy days they do not have to sit in damp clothing, catching colds. *At home in your care you guide and guard them.*

Kindergarten to High School

Calvert Courses are from Kindergarten—right through to High School. Missionaries, diplomats, business men in foreign lands, cultured parents in this country who wish a *better* training for their children have found these courses equal to those of our best grade schools—superior in many cases.

You owe it to your children to investigate the Calvert Courses—today. You will be surprised at their small cost.

CALVERT SCHOOL
169 E. Tuscany Road, Baltimore, Md.
Please send me full information about your Home Instruction Courses.



Name_____
Address_____

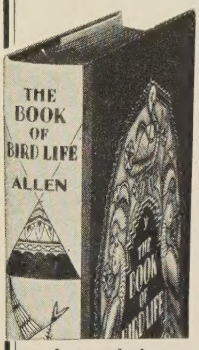
Bird Lovers!

Here's the Book You've Always Wanted

A *new* kind of bird book that not only helps you to recognize the birds but explains their *habits* in detail and enables you to understand the many puzzling things they do. Here at last is a comprehensive guide to an intimate knowledge of all phases of bird life.

The BOOK *of* BIRD LIFE

by Arthur A. Allen, Ph. D.,
Professor of Ornithology, Cornell



This splendid, illustrated handbook reveals in detail the amazing truths of the lives and habits of birds—their wonderful instincts, their growth, training, feeding, courtship—their home and community life. It tells you the secrets of their plumage coloration, shows you how you can learn their songs. And all of these fascinating details are presented to you not in bare facts alone but with explanations written in delightfully intimate style that enable you to understand bird-ways clearly and to interpret their meanings.

275 Unusual Photographs

Birds in flight, birds feeding the young, birds nesting, bird-life in its many interesting and curious phases have been caught by the author's camera and brought to you vividly in the pages of this book. Many remarkable action pictures are included. And to show you how *you* can enjoy the thrills of photographing birds, too, a whole chapter in this book is devoted to the subject.

20 Fascinating Chapters

deal with the lives of birds of the woods, orchards, fields, marshes, and shores; how to find birds' nests and identify them; how to attract birds; how to care for them as pets. In addition, you learn about the history and evolution of birds, their classification, their distribution among various regions, and finally, a complete outline for bird study is given. It is a thrilling book for entertainment and nature study.

See It at Your Booksellers, or
Get It for FREE Examination

Judge this book for yourself. Send no money. The coupon alone, with your name and address, will bring you a copy for ten days' free trial. If you decide to keep it, send us $3.50 in full payment. If not, return it to us and you will owe us nothing.

MAIL THIS COUPON TODAY

D. Van Nostrand Co.
250 Fourth Avenue, New York

Please send me a copy of *The Book of Bird Life* for examination. Within ten days I will either return the book or remit $3.50, payment in full. (Nature 9-30)

Name.....

Address.....

City.....State.....

The Wrestlers

A fierce battle between a trout and a water snake, in which the reptile would have conquered but for the intervention of W. Burt Clark, who witnessed the episode, took place some months ago in one of the many trout ponds that dot the highlands of the Sierra Madres.

Mr. Clark and his friends noticed a commotion in the pond. Water splashed and a trout broke surface and went down. Again his full length curved through the top of the water, and again he went down as the tail of the water snake flashed and was gone. A third time the trout came up, and the watchers could see the mouth of the snake holding him in the middle of his body. After a wrestle which boiled the surface of the pond, they both disappeared. Mr. Clark went closer, an oak limb in his hand. The snake could be seen under water, crawling close to the brink. A quick gesture with the limb tossed him out of the water and onto the bank. The trout was still in his mouth.

The snake dropped the trout and tried to escape, but a blow ended his life. The trout was still breathing. Mr. Clark put him in the pond, but he sank to the bottom and lay on his side. No signs of life were visible.

Mr. Clark looked away for a moment to tell his friends what was happening, and when he looked again, lo, the trout was gone. Only a silver flash in the water up stream marked his recovery.

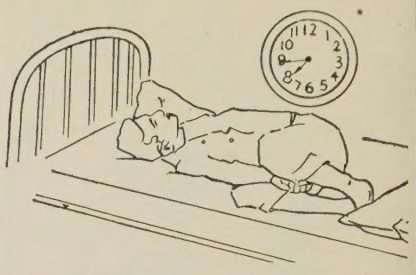
Demonstrating Erosion

The lesson of erosion's great destruction cannot be too often taught to American school children, and Leaflet No. 58-L, "Making a Model to Show How Forests Prevent Erosion", is one of the most educational issued by the Department of Agriculture. The model, the leaflet states, is simple to make. A large tray may be filled with earth packed to represent two hills. One hill is covered with moss; the other is left bare. When both mounds are sprinkled with a garden waterpot, the water coming from the "forested" hill will trickle slowly, and clear after a few minutes. The bare slope is gullied, however, by the water, which runs off rapidly in muddy streams. The leaflets will be sent on request to the Department of Agriculture.

California Parks

The California state park system is growing with leaps and bounds, as a result of the $6,000,000 bond issue and the progressive policy of Governor Young. Recently the famous redwood Del Norte Coast Park was established, together with the Patrick's Point area. Land on the slopes of Mount Tamalpais was condemned and added to the Steep Ravine area. The State Park Commission is now studying the Bull Creek Flat and Dyerville groves of redwoods, Point Lobos, and most of the available beach area in southern California. It has decided to acquire the Borego Valley desert area, which includes interesting growths of cactus and the native Washington palm, the Silver Strand Beach, and Palomar Mountain. The San Jacinto Mountain area has also been approved. California will be second to no state in its park system if the excellent progress of the last few years is kept up.

ACROBATICS *while you* SLEEP



Are you *sure* that you "slept like a log" last night? Or, would a moving picture machine reveal you rolled up like a ball, twisted like a rope or hanging over the side of the bed like a line of clothes? Drs. Johnson, Swan and Weigart took movies of 150 sleepers. The results were astonishing. They show that a soundly sleeping, healthy man may struggle through forty or fifty different positions nightly, not one of which will be held more than an hour. A description of this extraordinary, scientific experiment, with pictures of 33 "sleeping beauty" postures appears in the September HYGEIA, the Health Magazine of the American Medical Association. It is a real contribution to an all important subject.

COLDS *and* The Other Fellow

You have heard that colds are contagious, and you would like to know just how they are spread so that you can allay unnecessary fears and sensibly avoid the cold-infection. The September HYGEIA contains a timely discussion, by Dr. Rachael Ash, especially directed to parents and teachers, explaining the way colds spread and how to keep yourselves and your children from catching the debilitating cold germ—a most helpful article with the cold season just around the corner.

Other Vital Features in HYGEIA

"How Much Should the Patient Know?"—"The Tardy but Tempting Tomato" —"The Movies in Medicine"—"The Undernourished School Child" —"Questions and Answers"—these are only a few of the features of the September HYGEIA. Every article is written by an authority who proves theory with practice. The language of HYGEIA is non-technical, simple and even entertaining. Every issue is a gold mine of reliable health information. As you value your health you will value HYGEIA.

Special
INTRODUCTORY OFFER

HYGEIA
The
HEALTH MAGAZINE
6 months for $1.00
$3.00 the year

AMERICAN MEDICAL ASSOCIATION N.M.—8
535 North Dearborn Street, Chicago

Enclosed find $1.00, for which send me HYGEIA for six months in accordance with your special introductory offer.

Name .....

Address .....

The Swift Invasion

How a family—or community—of swifts scended upon a peaceful, and until then ppy, group and turned an erstwhile autiful home into a soot-laden smoke-use, is told by Florence Foster Hall of ew River, Tennessee. Miss Hall writes: "We had finished dinner, the three of us, t were still sitting around the table. Our mbined living and dining-room is an un-astered, raftered room having at one end a eat rough stone fireplace of unusual pth and breadth. The house is perched on p of one of the lower Tennessee hills, and ees crowd close to it on three sides. There usually considerable wind but it often goes wn with the sun, and on the particular ening in May of which I write, we could e, through the open doors and windows, e leaves hanging limp and listless from eir branches.

"Suddenly down the fireplace came a rush air; yet not a leaf stirred outside. The sh grew to a roar, but the leaves were atue-still. The roar grew to a gale. The ances of all three of us met as we sought nfirmation of our ears, but found the rld outside as if drugged.

"Comparing notes afterwards, we con-ssed to a second's wild idea of fairies, osts and the end of the world respective-The wind, swirling in that empty fire-ace when there was no wind, formed a ry disquieting sound.

"The scene which ensued was reassuring contrast, but I am sure it would have been aterial for Dante's *Inferno* had the poet tnessed it. Soot began to eddy out of the e, blacker and blacker. In a few seconds e whole room was filled with a murky, othering dust. You could not see. You ld not even keep your eyes open, and o your choking, gasping consciousness ne—creatures. They darted, swooped and pped in your face from out the dark-ss.

"I confess to instant flight.

"The others, braver than I, solved the mys-y. The creatures were chimney swifts. ere must have been seventy-five of them irling about the room, and their terrified ittering brought my own courage back in.

"I am not a naturalist. We had lodged ifts before, but why the birds chose to it us so intimately, I do not know. Be romance of their coming what it may, cruel, prosaic facts were three pailfuls black soot gathered from every horizontal face in the room. I could scarcely believe t even the long, sharp-tipped feathers of se birds could fan the air into such a e as had descended upon us, but the soot s mute testimony to the fact."

Manitoba Park

n furtherance of her policy to extend her k system, Canada has created another utiful national park in an outstanding nic area. The new playground is to be wn as the Riding Mountain Park, and nprises 1,148 square miles of rolling odland in the western part of Manitoba. region it embraces is filled with excellent ing streams, numerous lakes and fine ches. It is a natural home for big game, already contains more than 2,000 elk 500 moose. Clear Lake, a popular sum-resort, will be the headquarters for the park, a worthy addition to a fine system.

South Africa

A Travel Tour Unparalleled

The world's fair-weather sea trip to the charming Cape Peninsula—historic landmarks—luscious fruits—gorgeous flowers . . . Surf-riding and sun bathing at the gay seaside resorts of Muinzenberg, East London, Port Elizabeth . . . Oudtshoorn—herds of ostrich and weird Cango Caves—Rock paintings of ancient Bushman . . . Kruger Park—world's greatest natural "Zoo" . . . Pretoria, with its associations of Oom Paul Kruger—nearby the great Premier Diamond Mine, largest man-made hole in the world . . . Johannesburg, "City of Gold" . . . Durban, "Siren City" on the Indian Ocean, where East meets West—Prancing ricksha boys in bizarre costumes . . . Primitive Zulu kraals, witch doctors, fantastic ceremonies . . . Rhodes' Tomb on the granite hill of Matopos . . . Zimbabwe's mysterious Ruins . . . The sublime glory of Victoria Falls . . . A superb climate, blue skies, golden sunshine, and a wondrous pageant of scenic beauty . . . Beautiful, progressive cities . . . Modern railroads and motor roads . . . Excellent hotels.

SPECIAL AROUND AFRICA CRUISE

or independent tours—full information from Director, South Africa Travel Bureau, Department OD-2, 11 Broadway, New York City.

1-1569

A Fly's Mistake

The so-called lower animals have definitely fixed habit formations which permit only of a certain course of action, taken regardless of whether the result will be good or bad. A clear example of this is reported by Fabian Pollachek, one of the biology students of Far Rockaway High School, Queens, Long Island. While on a field-trip, the class found a drained starling egg which had been emptied by means of a pin-hole in one end. Within the egg were three adult flies. Since the pin-hole was too small to permit the flies to enter, the only explanation possible was that the female parent had laid her eggs through the pin-hole; the larvae developed into adults in their prison, and later had died of starvation when the original supply of food was exhausted. To the mother fly, the egg presented a safe place for her young; but to her children it meant a death-house, with no possible way of escape.

Porcupine Appetite

There is nothing proud or fastidious about a porcupine. He eats what he can get, and is glad of it. Recently, he invaded a tractor parked in a field in the Catskill Mountains of New York State, according to a report from C. K. Sibley, now of the John Burroughs School, Clayton, Missouri, and ate half of the fiber pulley in spite of its coating of gasoline, motor oil and kerosene. In addition, he gnawed on the breather cap and on the crankcase of the motor, taking away some of the mixture of dust and grease in both places. For some reason, writes Mr. Sibley, he did not touch the crank, "which certainly had an accumulation of perspiration." Probably it suggested too much work.

NATURE MAGAZINE

PUBLISHED BY THE AMERICAN NATURE ASSOCIATION

To Stimulate Public Interest in Every Phase of Nature and the Out-Of-Doors, and Devoted to the Practical Conservation of the Great Natural Resources of America

CONTENTS FOR SEPTEMBER · 1930

Photographic Department . . . . Robert T. Lowell 134
Editorial 141
Beneath Tahitian Waters . . . . . Lucy Salamanca 143
This Gardening Business . . . . Ben Hur Lampman 148
The Hermit Thrush . . . . . Edward A. Preble 151
Bronze-Sides the Gallant . . . . . Ben East 152
"Streak" . . . . . Marjorie Shanafelt 155
Handsome Isn't as Handsome Does . . . . Fred E. Brooks 159
"Mollie" . . . . . Joseph Baldwin Halm 162
The Unusual Cuckoo Family . Hugo H. Schroder 164
Birds in Color . . . . . R. Bruce Horsfall 165-168
Hollow Wall Gardening . . . . Francis Heatherley 169
A Tragic Battle 172
Taming the Catbird . . . . . Frank Bond 173
Plant Trees for Washington . . . . Charles Lathrop Pack 175
What's Inside a Binocular? . . . . . Ed Wolff 179
The Baltimore Oriole's Nest . . . . . C. L. Meller 181
Aster's Enemies . . . . . C. T. Gregory 182
The Hills of Fairyland . . . . . M. Luckiesh 184
Pseudo-Fossils Fool the Inexpert . . . . Charles W. Gilmore 186
In September Skies . . . . . Isabel M. Lewis 188
Things to Think About 190
Index to Advertisers 200

ORGANIZATION

THE MAGAZINE

PERCIVAL S. RIDSDALE . . . . . Managing Editor
ARTHUR NEWTON PACK . . . . . Associate Editor
RICHARD W. WESTWOOD . . Chief, Editorial Staff
R. BRUCE HORSFALL . . . . . Artist
EDWARD A. PREBLE . . . . . Consulting Naturalist
HARRY E. RADCLIFFE . . . . . Business Manager
PAUL F. HANNAH . . . . . Assistant Editor
GARNET W. JEX . . . . . Assistant Artist

THE ASSOCIATION

ARTHUR NEWTON PACK, President, Princeton, N. J.
CHARLES LATHROP PACK, Chairman Board of Directors, Lakewood, N. J.
PERCIVAL S. RIDSDALE, Secretary-Treasurer, Washington, D. C.
RICHARD W. WESTWOOD, Assistant Secretary, Washington, D. C.
HARRY E. RADCLIFFE, Business Manager, Washington, D. C.
WILLIAM L. FINLEY, Director, Wild Life Conservation, Jennings Lodge, Ore.
DR. E. LAURENCE PALMER, Director, Nature Education, Cornell University, New York
RUSSELL T. EDWARDS, Director, Educational Publicity, Washington, D. C.

SCIENTIFIC CONSULTING BOARD

DR. WALDO L. SCHMITT — Curator of Marine Invertebrates, U. S. National Museum
DR. LELAND O. HOWARD — Principal Entomologist, U. S. Bureau of Entomology
DR. HARRY C. OBERHOLSER — Biologist, U. S. Biological Survey
HENRY O'MALLEY — U. S. Commissioner of Fisheries
C. W. GILMORE — Curator of Vertebrate Paleontology, U. S. National Museum
VERNON BAILEY — Chief Field Naturalist, U. S. Biological Survey
DR. PAUL BARTSCH — Curator of Mollusks, U. S. National Museum
DR. EDGAR T. WHERRY — Wild Flower Preservation Society
DR. T. GILBERT PEARSON — National Association Audubon Societies
DR. WILLIAM M. MANN — Director, National Zoological Park

NATURE MAGAZINE, PAST AND PRESENT, IS INDEXED IN THE READER'S GUIDE IN YOUR LIBRARY.

NATURE MAGAZINE is published monthly by the American Nature Association. Entered as second-class matter May 31, 1927, at the post office at Washington, D. C. Additional entry at Greenwich, Conn.

Publication and Editorial Office, 1214 16th Street, N. W. Washington, D. C. Additional Offices of Publication, Greenwich, Conn.

SUBSCRIBING MEMBERSHIP BLANK WILL BE FOUND IN THE BACK PAGES OF THE MAGAZINE.

A. B. McClanahan, Advertising Manager

ADVERTISING OFFICES

New York—Graybar Building
Washington, D. C.—1214 16th St.
Chicago—Palmolive Building
Los Angeles—Lincoln Bldg.
San Francisco—Hunter-Dulin Bldg.
Atlanta—Grant Bldg.

Copyright, 1930, by American Nature Association

Title Registered U. S. Patent Office

NATURE'S CONQUEST

An Editorial

A ROBIN recently became lost in the hollow square of a great skyscraper in the market district of Chicago. Business in adjoining offices slackened while workers—hundreds of them—devised schemes to achieve his liberty. Window ledges became feeding stations. An important official of a great corporation ordered his office kept lighted all night, with the windows up, to attract the bird. For several days, until he found his way out, this feathered creature kept the center of the stage.

Another robin chose the airdump of box car X905055 of the Chicago, Milwaukee, St. Paul and Pacific Railroad, on a siding at Tacoma, Washington, for her nest. Not until her three eggs were hatched and the fledglings could fly was this car moved. The leading news services carried daily bulletins to their millions of readers on the event.

These incidents, which could be multiplied by thousands, indicate the state of mind of increasing numbers of Americans. Nature is conquering the United States. Each year, more and more people find in her varied forms delight and inspiration.

Evidence of the growing wave of Nature interest is not lacking. A large proportion of the millions of inquiries answered yearly by the Department of Agriculture pertain to Nature and its varied aspects. The twelve thousand square miles of National Parks and Monuments, created since 1890, and the 248,610 square miles of National Forests, set aside for the use of the country, attest to the growing love for the out-of-doors. The National Park Naturalist Service, recently established, has had to double and redouble its forces, yet never has had appropriations sufficient to meet the demand. Most civic organizations have committees on Wild Life or Conservation or the equivalent. Few cities and towns cannot boast of a growing, enthusiastic Nature Club. Primary and secondary school curricula, if up-to-date, include Nature studies. Leading magazines and newspapers are giving more and more space to Nature news and stories, in response to popular desires.

A glance backward reveals the change. Primitive tribes hated and feared the phenomena of Nature. Movements not man-made foreboded evil. Thunder was the voice of dreaded gods. The voicings of nightingale, goatsucker or owl presaged death.

Leaders of thought and public opinion, almost to the present day, were repelled by Nature. Madame de Stael, spokesman for the women of her age, hated the Alps and revered the glories of eighteenth century Paris. Samuel Johnson saw in a mountain only "a considerable protuberance." Birds and beasts of field and forest were either loathsome or edible. To the average southern European, a song bird is still but an object of diet.

The first American settlers intensified Old World attitudes. Forests were barriers to the progress of settlement. Wild things were food or enemies. The economic side of Nature alone was viewed.

Perhaps those great leaders of thought—Audubon, Thoreau, Emerson, Whitman, Burroughs, and their contemporaries—started the movement. Perhaps it began because men of science pointed the way to make Nature an ally, not an enemy. Whatever the cause, the tide had risen high enough in 1911 to drown out the voice of Uncle Joe Cannon, protesting against "buyin' scenery," and to establish the National Forest system. And it is still rising.

Nature's appeal is not, nor should it be, purely sentimental or aesthetic. It must be largely economic. Study of Nature has brought untold material betterment to America. The Department of Agriculture has saved hundreds of millions of dollars for business. The recreational advantages and natural beauties of certain sections have brought a new wealth. Nature and progress go hand in hand.

The conquest of Nature, too, is bringing a new patriotism. In proportion to the wonder and beauty citizens find in their native land do they love it. Nature interest is building a stronger, closer-knit nation in North America. It is building here a race of people who know the secret of living richly, abundantly; for those who can appreciate the beauties of forest and hill and the miracles that take place in the wild world grow immeasurably closer to that Golden Mean of Living Aristotle pointed out more than two thousand years ago.

The conquest, of course, is not yet complete. Some of Nature's creatures are still destroyed wantonly, ignorantly, in the name of "helping the farmer" or "sport." Her forest lands need replanting. Her landscapes are still distorted into battlefields of hideous color by billboards. Her open spaces are dwindling. But the period of reconstruction, conservation and protection has begun. Abraham Lincoln once said: "Public sentiment is everything. With public sentiment, nothing can fail; without it, nothing can succeed." And public sentiment is rising rapidly to stop depredations. Its vigorous love and attachment for the out-of-doors are driving legislatures, law courts and private enterprises to do its bidding.

Nature has conquered great territories in the first third of the Twentieth Century. And before the period closes, a complete adjustment between it and civilization may be made.

"ON ALL SIDES STRETCH CLUMPS OF CORAL, EXQUISITELY COLORED, MAUVE, PINK, BUFF, BLUE AND ROSE."

NATURE MAGAZINE

VOLUME 16 SEPTEMBER · 1930 NUMBER 3

BENEATH TAHITIAN WATERS

WHERE ONE MAN LABORS IN FAIRYLAND FOR ART AND SCIENCE

BY LUCY SALAMANCA

ILLUSTRATED BY ELIE CHEVERLANGE

DAWN in the South Seas does not "come up like thunder," but insinuates itself gently and colorfully into the gray of tropic nights. Over the moon-drenched islands of the Pomotus is diffused leisurely a quivering, roseate glow that tips the dark waters with green-blue tongues and obliterates the lumpy black fingers of isolated coral reefs under a limpid wash of buff and pink.

The tall, leaning palm clumps of the island groups emerge cautiously from silhouette, rustling slender sprays of frothy blossoms under their hard, brown shields; pricking a mauve sky with the green blades of leafy tufts, their bleached trunks swaying lazily against the bright blue background of Tahitian hillsides.

This entrancing period which hangs so tremulously between sleep and awakening, in the South Sea Islands, is the hour that lures the artist abroad. And, since pens and brushes were first conceived to serve the creative needs of man, these islands have called irresistibly to the artist fraternity. Their bungalows dot the hillsides of Tahiti, nestled amid coconut groves and tropical thickets, drenched in the glamor of southern seas.

At the foot of the Diadem and Aorai mountains, in the shade of a clump of coconut palms, stands one of these Tahitian bungalows. Its sloping roof is thatched picturesquely with dried pandanus leaves. Great, waxen, gardenia-like blossoms flower in its dooryard. Flaming hibiscus blossoms line the walk to its open door, above which a little bronze plate swings in the sea-breeze, modestly and amusingly announcing to the birds of the thicket that here stands the home of Elie Cheverlange, "Painter of Fishes." And, verily, the sign says truly.

When we acquired the cover for this issue of Nature Magazine we intended using it without special comment. Then we discovered there was a fascinating story back of it—a tale well worth the passing on to our readers. So here is the story of the fairyland under the waters of the southern seas. It is likewise the story of the man and artist who fashioned so beautifully the picture of the varicolored tropic lobster on our cover.

Within, the bungalow is a riot of color, its walls splashed with daubs of bright blue, vivid green, flaming scarlet. Look and you will find them to be studies of bright little "butterfly fish," or other colorful denizens of the deep, destined subsequently to delight a beauty-loving world from some skillfully executed magazine cover, or to make more alluring the pages of a scientific journal. For the fishes that Elie Cheverlange has studied and painted have brought him his measure of public attention. Yet it is doubtful if many of us realize the romance that has gone into the making of these illustrations; the patient, painstaking study and preparation necessary to achieve that fidelity to life that we have found so arresting. We may not know, for example, that this painter of fishes has braved sharks and barracuda, has been bitten and nipped by slimy creatures of the deep, pricked and poisoned by the blooms of undersea gardens, on his submarine explorations. Such a life work could only be chosen by a man possessed of an insatiable interest in life, a noble curiosity, a courageous and adventuresome spirit and an artist's heart. Such a man is Elie Cheverlange.

Stowed carelessly away in a box of gummed and stiffened brushes, among a few squeezed tubes of paint, you might come across the *Croix de Guerre*, with its three palms; the *Cross of St. George*, and the French *Médaille Militaire*, bestowed upon him during the four years he fought—a son of France—for his native soil. Crumpled and smudged, slipped between the sketches in his portfolio, you might bring to light letters from all corners of the globe, reminiscences of nights and days in many lands—rolled in his fur bag under the stars

of Baffin Land; stalking, for study, lean wolves across the blue snows that lie north of Baffin Bay, sketching white foxes baying at frosty moons; following a Fiji's woolly head through tropical jungles in quest of rare and beautiful birds for his canvas. You would find many curious and interesting mementos of an adventurous life among his trifles—a shark's tooth, a weird wooden idol of Vishnu, picked up in Benares, India; bits of jade from Chinese borderlands; or it might be a bit of kopra —the odor of which first lured him to Tahiti.

BELOW THE WATERS OF THE SOUTH SEA REEF

The artist with his simple equipment moves about in the gorgeous depths of his submarine studio

This painter of fishes comes of a family of artists. His father was an expert decorator in the French china factory at Limoges. Before the open fire of an evening, the elder Cheverlange would read to his son tales of adventures in many lands. One day the lad won a coconut at a roulette wheel in the village square. He broke it open and that night as the coconut dried before the fire he smelled for the first time the "kopra" of the island, while he listened enthralled to his father's tales of Tahiti. The odor of the kopra lingered in his nostrils. Through intervening years of adventure and achievement it led him eventually and inevitably to the land of his father's tale.

One day at dawn this painter of fishes emerged from the doorway of his Tahitian bungalow to set out upon the work of his day—the study of undersea life for future drawing. He is tall, well-built, of a strong physique, with a mop of unruly hair; a gentle, kindly expression and alert gray eyes that seem to find good the world they look upon. He is wearing, this early morning, no clothes other than a brightly-patterned native "parui" wrapped about his hips and a pair of high leather shoes. He carries a queer apparatus, consisting of a long, rubber tube and a flat slab of wood; two leaden sandals with

leather strap, a copper plate smeared with a greasy black paint, an ordinary nail, and a long harpoon. Armed with this diverse and interesting paraphernalia he starts off for the sands of the beach that stretch, black with strewn ashes that mean volcanic deposits, before him.

Past native huts of pandanus wood and ponds where cream-colored water lilies lift and fall he goes. Pulled up on the beach is the long, narrow native canoe made of "u-u" wood—the ironwood of the Pomotus. He climbs in and shoves off, and the "chug-chug" of his outboard motor comes more faintly across the water as the distance lessens between his craft and the coral reefs for which he is headed.

The canoe scrapes on a coral beach. The artist has reached the reef and he tosses overboard an anchor made of a lump of coral bound with a tough rope of coconut fibre. Then he equips himself for descent over the side of the reef. The leaden sandals — weighing fifteen pounds each —are strapped on over the leather shoes. Goggles which effectively shut out water from around the eyes are slipped over his head. An ordinary clothespin is clamped on his nose. Next, the rubber tube is inserted, through a hollow piece of bamboo, into a hole in the center of the slab of wood. This bamboo casing holds it upright when the wood is floating above the water. The other end of the tube is held firmly between his lips. This slender tube forms the one link connecting the diver with life, for through it he breathes while sketching or studying below the sea.

Over the side of the coral reef the painter of fishes climbs, descending hand over hand, finding his footing in the jagged rock as one finds his footing on the rounds of a ladder. Instantly he is in another world—a world washed with translucent green—a world of shifting

BUTTERFLY FISH OF THE TROPICS GLIDE BY

Vying with many rainbows they flash alluring colors through the greenish waters off the shores of Tahiti

shadows, darting streaks of color, swaying reeds. Who can describe that world better than the artist himself?

"Through the peculiar greenish light that diffuses everything," he tells us, "one can clearly distinguish objects as far away as thirty feet. Beyond that point the water is more opaque and objects are discerned but dimly. This body of green is shot through with darting streaks of color as fishes, large and small, flash by, their bodies of bright purple, emerald green, scarlet or brilliant yellow, gleaming as they dip and glide.

"That peculiar, embryonic life of underseas, known as 'plankton', which is made up of countless minute, transparent mollusks and crustaceans, gives a still deeper tinge of green to the water as one goes deeper. From above it is like looking through frosted glass, but as one descends he is conscious of a most intriguing sensation. It is as if he has lost identity and is being sustained in some mysterious planet where all motion is effortless and rhythmic.

"One cannot make a quick movement under water. One moves as a creature in 'slow motion pictures'. And because of this retarding of ordinary action, it is most difficult to kill a fish under water. No matter how speedy one's stroke may be, practically all force of the blow is lost. I always carry with me my trusty harpoon, but even though it is especially constructed for defense under water, it only serves to shove away unfriendly intruders. I have found the most effectual protection in absolute stillness—no motion of any sort, at the first hint of the presence of a shark or barracuda. For at the first quick motion of alarm they are upon you and there is nothing to do but make for the surface as speedily as possible, praying you will make it before losing a leg.

"I have seen these vicious creatures pass over my head like great submarines, shutting out momentarily the sunlight that filters through. I have remained rigid and motionless and invariably they have glided on their way. A single move would have meant, perhaps, my destruction. Some day, of course, they may spy me in an unfortunate moment. But then, *que voulez-vous,* even ashore one lives in the midst of dangers.

"For the most part I have found fishes to be a friendly lot, quite indifferent, after a first inspection, to the mortal who has invaded their haunts. They cluster about me, inspect me curiously for a moment, then go their ways, leaving me to my sketching or observation. I do not remain below for much longer than twenty minutes at a time, although one can stay a half hour with safety, equipped with my simple breathing apparatus. Longer than thirty minutes would be dangerous, as by that time the air in the tube, which I breathe, may form poisonous gases—the ascending impure air meeting the descending pure air. This system is, of course, imperfect, but I have found it satisfactory enough. It leaves my hands free for sketching, my vision clear and my body unhampered and able to move about as interest dictates.

AND THERE ARE LARGER, DANGEROUS FISH

Barracuda, sharks and octopuses add the zest of danger to labors for art and science beneath the sea

"On all sides of me stretch clumps of coral, exquisitely colored, mauve, pink, buff, blue, and rose, branching in all directions. Here are coral clusters, too, like great bunches of garden flowers. It is all like an old-fashioned garden, and one can imagine in the various groups hollyhocks, phlox, heliotrope, mignonette and sun-flowers blossoming in profusion. Intertwining branches of this coral form dark little caves, where fishes love to lurk when the sun is high. There is stag coral, shaped like the antlers of the majestic animal for which it is named, the flower clumps, and the mushroom coral, whose smooth, flat surface, crowning a sturdy pedestal, serves me for a stool or work table.

"Once seated thereon, my copper plate before me and nail in hand, I set to work, sketching a fin here, a tail

there, indicating coloring by the written word, making notes of the anatomy of a fish in motion, its mannerisms or any interesting habit or gesture. I sketch in coral groups, sponges, or other marine growths which can only be faithfully reproduced by study under water, alive and flourishing. Literally millions of blue specks, like little stars, dart about me as I work, as well as other fish striped in gold or orange, or daubed with vermillion. They twist and dive on every hand. They are the 'butterfly fish' of the South Seas and may be likened to the blue birds, the goldfinches, the scarlet tanagers of the world above the water.

"A *demoiselle*—her silvery and blue bars glittering coquettishly—encircles me. A *rouget*—a veritable smear of scarlet—dives into a coral cave. A black surgeon—the 'tang' of these waters—flips his vermillion tail in my face. An orange-and-blue trigger fish casually looks me over, its sharp, defensive tail arrows lying amicably quiescent. This colorful swarm surrounds me, occasionally nipping at my bare legs or shoulders.

"Little sea scorpions cluster about. A parrot fish, emerald green and blue, bears a head so similar to Polly at home that one is tempted to ask it if it would like a cracker. Many queer and interesting specimens pass my work table. Here is the 'mara' with a head shaped like a horse, colored like the horses of fairy-tales. Where but underseas could one hope to find a live emerald and blue horse? And where but underseas would one see anything so grotesquely horrible as the ugly 'nohu', who resembles nothing so much as a huge, venomous toad, with ribbons of green and tattered flesh floating from its body?

"Eels and turtles abound in profusion. One sees the turtles on their way up to breathe. Frequently one encounters a long, slimy creature of blue and green tentacles piercing the water, ugly head outthrust and tentacles floating behind, like a closed umbrella. It is an octopus that comes to rest on a branch of coral, opens up his tentacles—for all the world like an opening umbrella,—and clings there, waiting to suck prey into the parrot-like beak that projects from the center of its body.

"Often I chase an interesting specimen into a cave and capture it with my hands, then bear it to the surface to deposit in my aquarium. These fishes must all be painted from life, as their colors change immediately at death. The specimens do not live long in the aquarium and sometimes months elapse before I can finish a painting if my specimen dies before it is finished, for one must wait very patiently at times for another of that species to pass that way again. But these are the elements of danger and chance that add zest to any calling. What can be compared to the satisfaction one feels in eventually getting on canvas some rare and beautiful creature that it has taken months of patient effort and discouraging disappointments to observe?

"Certain crustaceans are among the loveliest of sea animals. There is the colorful blue and green crab, for instance, that boasts on its shell every conceivable gorgeous hue. But there are ugly specimens—as bad as they are ugly. One of the most repulsive of the ugly fishes is the 'patui'. It has an enormous head and a great, gaping mouth that is rolled at its edges and is used to suck in its prey, if this prey be huge fishes or man, which it absorbs at leisure. These creatures back into the coral caves and wait for their victims. I have always kept my distance from the 'patui'.

"Yet, to me, there is nothing so fascinating as the world beneath the waters. The study of its inhabitants and weird, beautiful growths is of a never-ending fascination to me. Observation of that life has been to me a thrilling experience—perhaps one of the most thrilling experiences of a life that has not lacked for thrills. It is another planet for man to explore, and in such exploration he knows the greatest adventure of his life."

Knowing that Elie Cheverlange is engaged in the illustration of various ponderous scientific journals for the National Museum of the Smithsonian Institution, we wanted to know, naturally enough, if he was to remain long in our midst.

"For a while—luckily," he tells us with his singularly gracious smile, "but when I have finished this work in Washington—who can tell? Of one thing only I am certain. Ultimately I shall return to our island, for I still carry in my nostrils the smell of its kopra."

NATURE CRUISE TO THE CARIBBEAN

Many of the hundreds who have been interested in the summer trips organized by the American Nature Association have asked, "Why not a winter trip, so many people are taking winter vacations now?" Well, after all, why not? On January 24 a personally-conducted group will leave on a Nature cruise to the Caribbean. The route will include Bermuda; Haiti; Kingston, Jamaica; Colon, Panama Canal Zone; Havana; Nassau, Bahama Islands, and arrive back in New York February 11. A special program for those specially interested in the natural history angle has been worked out. Write to Travel Editor, Nature Magazine, Washingon, D. C., for details and description.

"FOR HE WILL BE COUNTING HIS RADISHES . . .
The first delicately valiant shoots of the most dependable of vegetables"

THIS GARDENING BUSINESS

BY BEN HUR LAMPMAN

ILLUSTRATED BY HERBERT & HELEN WILLIAMS

SOME TIME within the next few days, on glancing from the window where hangs the canary's cage, I am fairly certain to observe my neighbor in an attitude of prayer. This shall not seem strange to me, for I know the excellent fellow in most of his moods and postures, and have had him under observation these seven years come April. He will be in his back yard at the time, the pregnant hinges of his knees crooked most devoutly and his head inclined after the manner of a Bedouin between caravan raids. By ordinary (I have this phrase from the delightful Cabell) my neighbor is not a prayerful man; not will he think to pray or give praise in that moment. But, as I say, he has few behavioristic secrets from me, and I shall know that he is all unwittingly at the altar, and all unconsciously addressing that Providence which commands the planets and the otherwise quite masterless and alarming suns. For he will be counting his radishes. He will be remarking, with that astounded joyousness which is reserved for gardeners, and which is sublimated devotion, the first delicately valiant shoots of the most dependable of vegetables.

"Hey!" my neighbor will call. And, there being no immediate response, a pained ire will manifest itself in a repetition of the cry. "HEY!" By this token I shall comprehend that he designs to summon his wife. (But I think I should inform you that this isn't his wife's name. Not by any means. It is only a sort of summons, a kind of come-hither, by which my neighbor effectually procures the attendance of his mate.) Then she will hasten to him, rather flutteringly, and with a banging of the kitchen door, and they two will stoop together above these marvelous radishes. I could wish that more folks grew radishes. I could wish that cabbages were accepted as cultural. I could wish that green peas were the motif of a grand opera. I could, honestly.

For I think, and wholly without levity, that suburban gardeners derive from gardens far more of produce than is represented by the half peck of rubescent Early Rose potatoes, be they never so precious; much more than the emerald scalp lock of a parsley bed; considerably more than golden carrots, ruddy beets, and attenuated string beans. The fact is, in strictest confidence, that gardens are always more or less a disappointment—in so far as their vegetables and blossoms are concerned—but, as if in compensation for this shadow of sorrow, they yield that priceless crop we call contentment. What is an onion? You will say that it is the queerest and most pugnacious fruit of the ground, without which the skillfully fabricated platter of hash would be at best a melancholy and depressing viand. Sir, I would inform you that, if you attend your own onion from the weeded rows of infancy to its appointed kitchen, you will discover it to be something better, something

finer, than a constituent of hashes, soups and stews. You will learn to remark its comeliness, its intelligence, its grateful response to the ministering hand. And when you come to part with that onion, when the knife carves its integument and tissues, down to the ivory heart of it, the tears you scatter may in part be offerings to sentiment.

They say that man was first of all the ruthless, savage hunter, and that never since he emerged from the dawn forests and the caves of dawning has he known a joyance to vie with the thrill and tumult of the chase, or the stealthy progress from shadow to shadow as he stalks his kill. I will grant, for there really is no profit in this controversy, that the urge to hunt is an elder instinct, yet I am persuaded that so soon as man had wit to perceive his opportunity, this dabbler in blood became a confirmed clodhopper, a gardener, if you choose—and certainly a marked improvement as a citizen. He was always an eater of wild roots, bulbs and seeds, and when the plants that provided these sprang from his midden our untutored forebear realized, gropingly and with some little labor, perhaps, that here was food near at hand. And he grinned as he stood there, thewed like the auroch, shaggy as the cave bear—he grinned and knew that it was good. "Hey!" he called to her. And again, with evident impatience, "HEY!" He was a gardener thenceforth. A hunter, too, but nevertheless a gardener. One of the most valuable of all lessons was learned. For he knew, though he never applied the knowledge as he should, no more than we, that it is more blessed to create than to destroy. The force, the vitality, the persistence of this knowledge have ransomed his line from squalor and an early death. I always think of him as Og, the first gardener. Good Old Og!

"SHE IS A LONE WIDOW-BODY . . .
Her garden is the admiration of the vicinage."

It's funny about gardens—that is to say, I mean it is odd. You can never tell me, though you cite forty professors to prove it, that every green and growing thing, yes, even the dark loam and the yellow, refractory clay, does not have an especial fondness and recognition for those who hold these in affection. I would say to the forty professors, with their talk of composts and drainage, and nitrates and cultures, "Oh, go on!" I would say to them, "Sniff!" For though there is a great deal in the books, and it is best and wisest to consult them, there is vastly more in the heart, or the intuitions. Do you argue that one who did not love his labor, albeit his training was of the best, could paint the portrait of a laughing child? The elfin eyes? The semi-parted lips? The poised grace of the tilted head, aslant on its shoulder? The eagerness? Thus it is with gardens and with gardeners; a deal of it is in the heart. The gardens know.

Now, for example, I have in mind another neighbor, whose garden patch is snugly fitted into the narrowness of a single lot, minus the cottage area, a prized Yellow Newtown, and the clothesline posts. You will readily apprehend that the field of her endeavors is considerably circumscribed, not to say restricted. She is a lone widow-body, whose children have all grown up and gone away . . . gone away. Let us designate her as Mrs. X. This Mrs. X. has little patience with books, because many of the words are so long, and she has only slightly less patience with newspapers. These last are excellent for pantry shelves. Her literary knowledge of gardening is, therefore, limited to a hasty and often amused inspection of the directions on seed packets. But her garden invariably is the admiration of the vicinage. All that she touches with blunt, work-worn fingertips is astonishingly imbued with courage and the will to thrive.

Mrs. X. exhibits the first early potato, though she may have planted later than the rest of us. Hers are the earliest of early peas, and the ravaging root maggot knows better than to tamper with her radishes. If she were to thrust—I purposely exaggerate the astounding fact—so spent a thing as a broom-handle in the miraculous and thankful loam, it would revive and flourish, and send down roots, and put forth verdure and blossom, and possibly bear cherries. I am certain, or fairly so, that it would bear cherries if she put her mind to it. Ah, well; such mystery as this is quite beyond me. On similar soil, with improved equipment, and no stinting of patent fertilizers, I coax and cozen into succulence a rather indifferent turnip. I say it is quite beyond me, except for this—that somehow this lone widow-body is nearer to the soil than I; somehow

she has kept her contact with the secrets of the dark woman of the field and forest, who has charge of all growth, all verdure, all fruitage. The soil understands her and responds. If you are a gardener you will comprehend.

I am positive, however, that the widow-body herself believes there is magic involved in this enterprise, for she confides her seed potatoes to mother earth only in the dark of the moon—though she cannot or will not tell you why. But flowers; with flowers it is different. If you would have a profusion of blossoms, and these the perfection of form and color, you must never, never forget—or so she warns —to plant your flowers in the light of the moon. And a new moon that is aslant will spill its water—hence rains may confidently be anticipated. If crescent Luna, however, is inclined so as to conserve the water, then you may depend on this—we are going to have a dry spell of at least a fortnight's duration. Yes, it is a variety of magic, this gardening and its omens, portents and rites.

AND THE GARDEN IS A HAVEN
It is host to many besides the flowers that people it

The fraternity of gardeners is not least of those mutualities of temperament which cause the planet to be tolerable. Not least. I know, of course, that my neighbor will look with jaundiced eye on the first strawberry, if it ripens on my vines before the robber robins spy it out. He will be thinking that it might, and very properly should, all things considered, have ripened on his. His encomiums will probably be faint and forced, and seem to stand in need of weeding and watering. But I shall forgive him this, because it shall be my berry and not his. My heart shall go readily out to him, poor fellow—in the event, let it be plainly understood, that the first strawberry is found on my vines. Otherwise, I am not so sure of the situation that shall exist between us. Well, proceeding on the assumption that the berry is mine, it will be but a day or so before he hails me, from his back yard to mine, and I shall know that he has been reinstated in his own opinion. For he will have a bigger berry than mine, and it may even be that he will have so many as three bigger berries. According to the rules, I must not grudge him these, nor shall I. Having shared those remarkable fruits of the field, and after grave discussion of their merits, he will be cocking a weather-wise eye at the heavens. "Looks a little like rain," he will say. This shall be my prompting to respond, glancing likewise at the darkling sky, in that soft twilight—for it will be evening then, and falling rapidly—to say, "Sure does." And then, "We could stand a little rain." And he, "Sure could." And peace, tolerance and fraternity shall be between his house and mine. At that, in a manner of speaking, he is quite a capable gardener; he really is.

To the casual and inexperienced eye all suburban gardeners are plodding dullards, of an otherwise inexplicable patience and persistency. They seem uninspired peons or peasantry, poor of garb and much bedaubed by intimate, unflinching contacts with the rather messy and ill-favored earth. Their shoes are burdened with clay, their hands are grimed, and it needs only a Markham to pity them in their plight and make for us a song of the man with the trowel—of the man who kneels on the wet lawn, as he were devotionally postured, and with prayerful putterings sets the seedlings in their border, or plants his lettuce rows. Yet if you pity him or feel the inward whisper of superiority—that unspoken word which tells you that there are happier ways of spending the hour, and that you have the secret of these, as he has not—why then you lack for understanding. And this is a serious lack, with portents not of the pleasantest. For he is happy, this gardener, as few men are happy.

If he works among his perennials today he observes that the peonies have tips that are smooth to the touch, and of a delicate rose and ivory color. Within these tips and in the root beneath them are rounded masses of verdure and broad, creamy blossoms, and flowers as scarlet as a cardinal's robes. Amid the dried, lifeless stalks of the delphinium, crosiers of lune-green growth are glimpsed, and with these, as he clears away the debris and loosens the loam, he must be more than gentle lest their fragility come to ruin. He has this feeling—and there are men of science who have essayed to prove it a guide to the fact—that to harm these aspiring shoots of the delphinium would be to give pain to the plant. Here, when summer is with him, and there are humming birds droning in the garden, the delphiniums shall stand as queens empurpled, though this regality now is locked in the wise and prudent root. But the key turns. Almost he hears it, the master key that opens the

portals of living. Why, it is permitted him to have the key in his grimy hand, and to play that he aids the dark woman of the field and forest in turning it. When the key has turned, and the bolt has clicked, and the paired doors open, it will be June and he will have his dream.

They say that golfers get a great deal out of golf. That is how they say it. I assume that golfers do get a great deal out of golf, and I wish to assure them that they can continue to do so, for all of me. I have no quarrel with golfers, but it has always seemed to me a shocking waste of energy and arable land not to plant something where they so cunningly, and expertly—and sometimes profanely—till the turf. Shocking, I call it. Many a grand gardener, I have no doubt, has been ruined and thwarted to make an indifferent golfer. However, I am disposed to be charitable toward any pastime or avocation that summons us out of doors, where the goodly earth is under foot and one is vaguely, pleasantly aware of influences and motivations that are older—yes, immeasurably older—than recorded time. I am, indeed.

But a garden, well, a garden is a garden, and there is no getting around that. A man in a garden, his own garden, is playing at Providence. The creative instinct has found a normal and fascinating outlet. The feel of the soil is remembered somehow by the blood. It permeates him, vein, artery, and heart, until he gladly confesses his kinship with the loam, exults in it, acknowledges his conversion, and draws strength therefrom. And the thrust of a seedling through the soil, be it flower or vegetable, is both miracle and triumph. There are few enough of these in life—few enough that we will recognize.

A garden has the trick of never being exactly what you dreamed it would be. The entrancing lithographs of the catalogs are delusive. There are no such tomatoes, sir, nor any such delphiniums. And yet it is lawful and desirable that a garden should ever fail of perfection. It is the striving for perfection that lends faith and prayer to the purpose, and which even creates the purpose itself. And so I am constrained to believe it is quite as well we may not witness nor ever have the full fruitage of our dream. For thus, and only by this dispensation, are we privileged to retain the purpose and to dream again—whether of gardens that are tall and bright with bloom, or of another project grown dear to us.

THE HERMIT THRUSH BY EDWARD A. PREBLE

Well is he named the hermit, this sweet singer of our northern woods, not that he seeks always far-hidden haunts, but that his chosen home seems ever sacred to him. Of all our thrushes he most seems to love both the earth and the sky. His evening song is poured out from some high-flung perch, but when he builds his home, he comes down to Earth's very bosom, and on her nurturing breast, hidden by vine or bracken, he weaves that deep-cupped bed to hold the precious eggs, tinged with the very hue of heaven.

WILLIAM L. & IRENE FINLEY

A SINGER OF BEAUTIFUL SONG

The hermit thrush, northland lover, with her hungry family, who too will grow to utter the mellow and flute-like notes

And how he loves that summer haunt, for when Keewadin, the North Wind, chills and scatters the leaves that have sheltered him and covers deep his food so that he needs must leave, he retreats only a little way, and there braves snow and scanty fare, asking but a sheltered thicket where cling a few frost-cured fruits that will sustain him in his exile. Now he is silent, save for the one sad, lisping note that spells his longing for his northern home.

But when the mounting sun and south-born breezes tell him that he may return, blithely he wings northward, silent at first, but as he nears his goal he regains the will and power to pour forth that song of praise that is among the most sublime of all Nature's voices.

Brave and true little hermit, asking only for his summer home a quiet corner in some northern waste of peaceful glade, with airy perch where he may borrow from the symphony of heaven its sweetest notes, unheard and unknowable of human ears, and translate them into chords that even we of earth may dimly understand.

BRONZE-SIDES THE GALLANT

HOW MICHIGAN KEEPS HIM IN HER STREAMS

BY BEN EAST

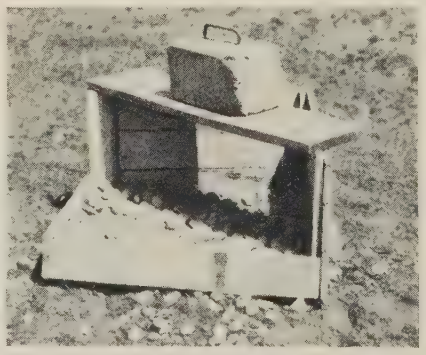
Mr. East, a frequent contributor to Nature Magazine, is Nature editor of the Grand Rapids, Michigan, "Press" and in charge of the outdoor pages of seven leading Michigan dailies. He is a true lover of the out-of-doors

THE HATCHERY POND

At the Comstock Park Hatchery. Scattered throughout the shallow water are the nesting boxes

THE May sun shone down, warm and bright, on the ponds of the Michigan state fish hatchery at Comstock Park. High overhead a jack snipe winnowed through the cloudless sky, sending down his matchless wing music to a shy brown mate that waited in some hidden marsh covert.

At the end of the hatchery grounds young leaves were opening on a silvery birch, and from the topmost branches of the tree a redwing blackbird spread the buff and scarlet epaulets upon his shoulders and sang joyously and proudly, time after time, his song of spring, "Conk-a-lee—conk-a-lee!"



SAVING BRONZE-SIDES LABOR

Hatchery attendants build this future home of thousands of bass eggs

Up from the shadowy depths of the bass wintering pond a long dark form glided, approached the shoal water near the shore, began nosing there, clearing a small round patch.

Farther along the shore of the pond a dozen dark forms were similarly occupied. All around the margin of the pond, out in water a foot or so deep, were little circular spots where the gravel was swept free of debris, where the beginnings of nests were being laid.

Bronze-Sides, the Gallant, the small-mouth bass, could not hear the jacksnipe, took no notice of the bursting leaves on the birch, did not know the redwing sang, but there was a quality in the warmth of the water under the magic May sun that spurred him to feverish activity. It drove him up into the shoals of the wintering pond to prepare a clean bed of gravel for the rite that is ancient above all others among the creatures of the earth—the rite of replenishing the waters or the earth or the air with new life. Bronze-Sides but responded to the call.

Claude Lydell, overseer of the Comstock Park Hatchery, on this warm May day, arose from dipping a small thermometer into the water of the pond.

"Sixty-five degrees," he stated. "And they have been working since yesterday afternoon. It's time to seine them."

Twenty-four hours later, one hundred seventy-five pairs of small-mouth black bass had completed spawning in the breeding ponds of the hatchery. More than a half million bass eggs rested among the pebbles of nests that had been prepared weeks before, not by the bass but by attendants of the hatchery. One hundred seventy-five female small-mouths, spent with spawning, finished for that year with the greatest event in all Nature's cycle, had drifted or been driven away from the nests. One hundred seventy-five male bass were on guard over as many nests, beginning the tireless, valiant vigil that would not end until the young bass were old enough to fare for themselves, days or weeks later. All within twenty-four hours, and it had come about this way:

Less than three decades ago the small-mouth black bass was the despair of fish culturists. Bass, unlike trout, are not successfully propagated by stripping the eggs from the female, artificially fertilizing them with milt from a male fish and hatching them in hatchery jars or troughs. These fish must be allowed to spawn naturally in ponds, exactly as they spawn in their native lakes and rivers, and attempts with the small-mouth had brought only discouraging failure.

Then the late Dwight Lydell, the uncle of the present overseer of the Comstock Park Hatchery, and then employed by Michigan at the same famous fish-breeding grounds, turned his hand to a study of the spawning

habits of these fish. Much of the research was done from a prone position on the bank of some stream, where the fish culturist could observe the natural spawning of the fish, the care of the young and all the other details of the huge task of propagation.

It was as a result of these studies that the Michigan hatchery came to be the first in the United States successfully to breed the small-mouth, and the methods developed by Mr. Lydell are still in use, a standard practice in the culture of these fish. He continued in charge of the bass hatchery until his death, three years ago, when he was succeeded by men whom he had trained in bass culture.

Weeks before the spawning season of the small-mouth approaches, the breeding ponds are drained and the nest boxes set in place. These boxes are open on two sides and the bottom is lined three or four inches deep with clean, coarse gravel. The boxes are weighted down in locations that will bring them in water a foot or so in depth when the ponds are refilled.

As spring advances the temperature of the wintering pond is retarded by an inflow of cold spring water. If possible, the water in this pond is kept about ten degrees colder than that of the breeding ponds.

When, at last, the water of the wintering pond becomes warm enough to stimulate the spawning instinct of the fish and the males begin to prepare the natural spawning beds, the pond is lowered and the breeding stock is removed by means of long seines.

The fish are then dipped into tubs on shore. A skilled hatchery attendant sorts them as to sex, placing them in other tubs that are waiting close at hand. They are then transported to the breeding ponds.

An equal number of male and female fish is allotted to each pond, the number of pairs being determined by the number of nests previously prepared.

The fish, released in water some ten degrees warmer than that from which they have just been taken, are possessed almost at once by a frenzied desire to spawn. This instinct is goaded to a peak within a few hours and each male bass immediately selects one of the nesting boxes, entering it as readily as a farmyard hen takes to her straw-lined nest, and appropriates it for himself.

To this box he drives or drags the mate of his choice,

SEINING OUT THE BASS

When the waters warm, the bass in the wintering pond are removed to be placed in the breeding reservoir

SEPARATING THE SEXES

Arthur Host, former hatchery overseer, sorts males and females before the spawning takes place

a female bass heavy with spawn. Bronze-Sides does all the wooing and he is neither gentle nor chivalrous about it.

There on the clean gravel of the nest the female bass deposits her thousands of eggs, and over them the milt of the male fish is poured in a diffused, life-endowing, milky spray.

The female bass soon drifts away from the nest and severs all connection with her mate and the young bass that will shortly be hatched. If she returns to the nest a few hours later she will be looked upon as an unwelcome intruder by the faithful guardian of the nest, and will be driven away.

Bronze-Sides takes up his sentry duty above the gravel bed as soon as the spawning is finished. Hour after hour he lies there, a few inches above the bottom, casting his black shadow motionless on the nest, ever on the alert for enemies that may creep or swim upon him from all sides. As far as hatchery men have been able to learn he does not feed from the hour he takes up this vigil until the fish have hatched.

In the ponds of the hatchery the chances that a foe may disturb him are scant but he does not know that, and he guards the nest as valiantly as though it were located in the shoal water of a cool, hill-girt river, where the foes of bass eggs are numerous. For uncounted centuries in the life of the water folk there has been no parent more devoted and gallant than this curving sickle of bronze and steel, and even though his young be hatched in the

sanctuary of a hatchery pond he upholds pridefully the traditions of his clan.

As the time of spawning for the bass is dependent upon the warmth of the water, so does the length of time required for the young to hatch depend upon that same factor. If all goes well and the spring sun continues to shine warmly down upon the ponds, the tiny fry will come forth from the eggs in six to ten days after the eggs are fertilized.

For two or three days after that the young bass remain hidden among the stones at the bottom. Then, in the language of fish culturists, they swim up, a numerous moving cloud of tiny black specks.

In the latter days of his fatherhood, Bronze-Sides escapes much more lightly than his kinsman, the large-mouth bass. Indeed, he even appears to be somewhat less of a model father.

With the swimming up of his young from their bed the large-mouth bass begins riding herd on the school of baby fish, circling tirelessly and ceaselessly around them. Woe then to any intruder that approaches too near. Be he large or small, any water creature that draws close is a foe to be charged on sight with all the gallant courage of the bass clan.

Hour after hour, day after day, the male large-mouth continues his rounds. As his young grow larger his task becomes more and more difficult. There is a constantly increasing tendency among the young fish to leave the school, to dart away and fare for themselves, and this tendency the vigilant parent combats as vigorously as he repels the approach of any alien fish. A young large-mouth separated from the school stands a poor chance of ever riding herd on a school of his own. At least that is the way the male fish apparently reasons it out, and he labors as if he desired grandfatherhood above all other estates.

Finally, however, he is frustrated. The young become too large to be longer herded together. They break the school formation and are gone, each to fend for himself.

For Bronze-Sides, the small-mouth, however, there is none of this tiresome herding. When his fry swim up from the bed his sentry duties are at an end. The horde of tiny fish scatters, each seeking its own place of refuge in the underwater jungles.

Later he will be returned to the wintering pond to await the coming of another May and the warming of the waters that shall warn him when it is time to begin fanning and nosing clear a gravel nest once more.

INTO THE SPAWNING POND

An even number of each sex are dumped into the warmer water, where they soon will produce their young

As for the young bass, they are removed later from the breeding ponds and transferred to rearing ponds where they are kept throughout the summer for fall planting, not as tiny helpless fry likely to fall prey to every foe that passes, but as lusty fingerling fish that stand more than a fair chance of surviving.

Michigan has decided, in common with many other states, that game fish propagation shows results and pays dividends in direct ratio to the proportion of young bass and trout planted as fingerlings. Only the bass for which no room can be found in rearing ponds are planted as fry, and their numbers are relatively few.

Rearing ponds are operated by the Michigan conservation department, by chapters of the Izaak Walton League and by independent sportsmen's clubs. Into these ponds the young bass from the hatchery are put, to be fed throughout the summer on a diet of daphnia—perhaps you know them as water fleas—minnows and other food. Feeding experiments on both bass and trout are constantly going forward in the rearing ponds.

In autumn when the numerous children of Bronze-Sides are sturdy young bass averaging four or five inches in length, they are taken out to be planted in the lakes and rivers that are the boast of the North Star State.

October Nature Magazine, inaugurating the fall season, will present an interesting and varied group of articles, with something for every type of reader. The late Dallas Lore Sharp, warrior for open spaces, leads the issue with one of the last articles he ever wrote, "The Florida Flatwoods". William M. Mann, "Uncle Sam's Noah", is delightfully biographed by Alma Chesnut, and Ernest Elwood Stanford dramatizes the vital story of that heart-stimulant and garden beauty, digitalis. Ben Hur Lampman follows his garden epic, in this issue, with the saga of Philibert, a silver gray squirrel; Rhea Kimberley Johnson describes the antics of her pet Abyssinian cavies; the tribulations of a paleontologist with pseudo-fossils are brought forth by Charles W. Gilmore. The bird element is supplied by two interesting pages of bird pictures, and by Walter J. Wilwerding, who writes on African birds. George Hellman contributes some of the most remarkable Mexican jumping bean pictures extant, and Romaine B. Ware has a host of information on bulbs.

"DON'T TRY ANY TRICKS NOW"
Streak, the mother, gobbles rapidly while her bright eye watches for human invasion of her rights

VERY PINK AND WRINKLED
All of twenty-four hours old, but able to rise up on its forelegs

JUST ONE WEEK OF AGE
They're now quite dark with eyes bulging from the covering of skin

"STREAK"

THE STORY OF A GROUND SQUIRREL AND HER BROOD

BY MARJORIE SHANAFELT

When Marjorie Shanafelt was eighteen years old, she had never left city streets and third floor apartments, and had little idea of or affection for Nature. Then she went tiger beetle hunting with a new friend —and that is why today she is curator of Visual Education at the University of Nebraska Museum, the locale of so many of her entertaining animal stories. Her two avocations are playing a harp, of which she says, "Without it, I would not be I", and writing. Nature Magazine readers will hear from her again when further events of note and interest happen out Lincoln way

THE MUSEUM truck backed up to the double doors of the workroom and the men unloaded an enormous box. An inquisitive assistant, as soon as it was in the workroom, ripped off a board or two to see what kind of fossil bones had now come in.

"Only elephant bones! More elephant bones," he grumbled as he went out, leaving the room to silence and the Professor, who sat scratching on a paper beside a table strewn with yet more elephant bones.

Suddenly the Professor became aware of something different about the window-sill. He wondered if absent-mindedly he had not transferred himself to the prairie. For among the odds and ends accumulated on the sill sat a graceful, striped ground squirrel, eyeing him with its dark eyes as if it, too, wondered about the elephant bones. The Professor uttered an exclamation—not a loud, or vigorous one, because Professors are used to having strange things happen in a museum—but low-voiced as it was, it startled the visitor from its erect perch. It jumped to the work table, and as if by magic, disappeared.

"Well, well," said the Professor, and investigated. It was easy to determine that the squirrel had come in the packing box, for the bones were protected by hay—but who had nailed him in? The two-week trip could not have been exactly comfortable, and the bill-of-fare, with a choice between the elephant bones and hay, must have been quite monotonous.

The Museum always welcomes wee visitors and a pair of willing feet were soon hurrying to the friendly corner grocery store for carrots and cookies and milk. These were spread on the work table and in due time the stowaway crept out from its hiding place to drink long and thirstily and to eat most fastidiously, turning the slices of carrot round and round between its paws as it nibbled, letting the discarded rind shower to the table.

Clearly here was a case demanding the attention of the

THE CHARMING TIME OF BABYHOOD

They posed most beautifully, and were utterly unafraid. Their tails were still somewhat skimpy

entire museum staff. The little squirrel must be returned to some unsupervised bit of greensward in the outer world, but first it must be captured. This called for strategy. Towards evening a small cage was placed on the work table. It had a delicately balanced door. The cage was enticingly strewn with wheat and that item most choice of all a squirrel's diet—sunflower seeds. There was also a juicy bit of orange and a squatty dish of water. Furthermore, there was a great puff of cotton wool for a bed in case the little fellow got caught early in the evening.

In the morning the Professor tiptoed to the workroom and peeked in. The cage door was down! That surely meant the squirrel was inside. As he approached the cage the little fellow darted out of the cotton. "Just like a streak," laughed the Professor, and so Streak was named. The Professor looked more intently at the white cotton bed. Strange, but the nest had something else in it, something that had not been in the cage when he left it the night before. Some odd pink bundles about the size of the Professor's thumb were squirming about in the hollow in the cotton. Their skins were too big for them and very wrinkled, and there was a delicate purplish hue on their backs. Dark spots showed through the thin pink skin where their eyes would some day be. As the Professor put his hand on the cotton the little mother rushed to the corner of the cage and clung there, frozen with terror. The Professor counted, "One, two, three, four, five, six, seven! Seven of them!" He tucked the cotton around them and sat down to think about it. Adopting an orphan is a serious proposition, but adopting a whole family is more so, yet it had to be done.

A big cage was brought out and cleaned, the cotton bed full of babies transferred to one corner, with the little mother, who dashed about wilder than ever. As long as the babies were little, Streak didn't like us, not one of us; toleration was the best she had to offer during those first weeks of caring for herself and babies. The cage was placed in a pleasant window and everybody in the building tried in vain to win Streak's affection; but she never resented anyone handling the babies. As soon as she had them to herself again she tucked them into the cotton and cared for them, but she was too terrified at humans to do more than run into the top corner of the cage and hang there until the disturber had gone away.

When the babies were one day old they could prop themselves up on their forelegs, but the hind legs were absurdly weak. They lifted their too-large heads sturdily, and could, by wriggling and squirming in a lively manner, cover considerable ground in a moment's time. By the end of the week their backs were growing quite dark and one of them showed the first indications of tiny whiskers on his diminutive nose.

THE STRIPES BEGIN TO SHOW

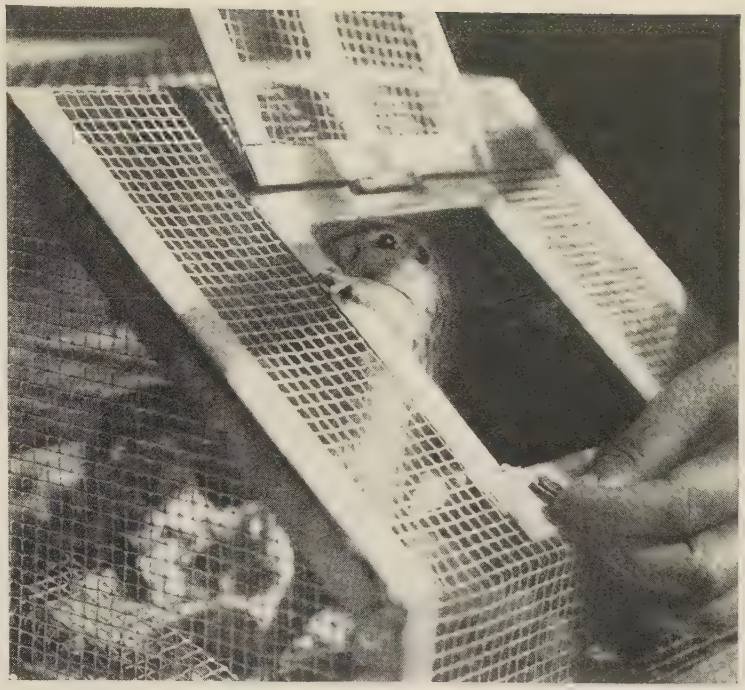
By the time they were sixteen days old, the polka dots and lines became visible

Their mother took excellent care of them. If she wanted them in the cotton nest when they had squirmed out of it, she picked them up by the backs of their necks and carried them back. As they grew heavier she took hold of them lower down so as to balance them better. Long before their eyes were open or their teeth more than white dots on the pink of their mouths, stripes were beginning to show on their backs, at first so indistinct that one wondered if he merely imagined them. By the time their big eyes opened, which wasn't until they were four weeks old, they were gloriously dressed in polka dots and thirteen rich brown stripes with tawny lines in between just as their mother displayed. Along their sides long hairs stuck out giving them that delightfully immature look so charming in kittens and young birds.

By the time their eyes were open they began to imitate

their mother and when she ran for a corner of the cage all the babies ran too, even though they didn't know why they did it, for they weren't a bit afraid really. Since there weren't enough corners for one apiece they hung in bunches as close together as possible. Everyone loved to fondle the soft, silky things, and they sat quietly in one's hands for many minutes, gazing around with their beautiful eyes in an unconcerned manner. Suddenly they would try to fling themselves out of the hand that held them, with kicks, and shrill cries, nipping with sharp teeth that now meant more than pin pricks.

A large potted plant was put in the cage. How the dirt did fly! Soon there was not a squirrel to be seen and the plant rocked perilously when touched. The plant soon died but the little squirrels raced into the flowerpot cavern the moment anyone approached. Bits of smelly food always coaxed one pair of bright eyes after another out from the depths and soon they would be sitting around unconcernedly with orange juice dripping from their chins, or with yellow cheese gripped in their small paws, having the epicurean time of their lives.



COAXING THE MOTHER TO EAT

She was difficult to bribe at first, but as her children grew, she became friendlier

Streak, beginning to feel that her family was growing up, grew friendlier. She would take food from our hands, placing her paws on our fingers while she tugged at nuts held firmly for delight of feeling her there. Since food was the way to her heart she had the best of everything. Fresh lettuce she always had, and she ate about four leaves a day. A medium sized leaf took just twelve seconds to eat. Sunflower seeds, cantaloupe seeds with the wet membranes on them, all sorts of nuts, raisins, cake, cookies, fruit, bran and milk, cottage cheese she ate, but above everything did she love ice cream, melted enough to be a thick, gooey drink. Streak knew that when the white cap of the paper carton appeared it meant ice cream and was at the cage door before we had our fingers on the latch. Hanging half out of the cage she grabbed it with her paws and began to lap it up walking backward at the same time as she was urged back into the cage. Often she was so eager for it, that she knocked the paper dish out of our hands and spilled the contents.

NOW WEARING MATURE DRESS

After a month the mother's attire of dark stripes bearing yellow polka dots was permanently adopted

Although Streak had no desire to get out of her cage, the youngsters had, and one day the Professor walked into the room just in time to see one baby flipping out the cage door and another one, startled a bit too soon, falling back on the inside. Someone had left a latch off. The word spread quickly. Baby wild things in a big building are bound to meet with misfortune. Doors went shut on all sides of the workroom. Food was placed on the floor of the office just off the workroom in an effort to attract the Deserter into a smaller room. The food disappeared promptly. The wire trap was placed on the floor and food and drink and a cotton bed put inside. In the morning the food and drink were gone, so was the cotton bed. Evidently the trap door did not react to so light a weight as that of the Deserter. It had let him run back and forth until his bed was carried away. Careful search revealed the bed, well mixed with brown paper scraps that he had industriously peeled from a paper package on the floor—tucked between a large desk and the wall. Deserter believed in making himself comfortable. Shut went that office door. Through its glass anyone in the workroom could keep a close watch on events in the office.

At noon when the building grew quiet, when hurrying feet no longer went up and down, the Lady-Who-Knows-All-About-Rocks saw little Deserter come out from behind the desk, wriggle his whiskers and eat all the food in sight. Satisfied that he was quite alone, he remembered what his mother had taught him and sat down to scrub his face with the sides of his paws and to comb his tail with his long nails. The Lady-Who-Knows-

All-About-Rocks went into the office. Deserter vanished like a flash. The Lady-Who-Knows-All-About-Rocks sat herself down, cross-legged, on the floor and imitated a statue. She sat there half an hour and Deserter peeked around a corner. She sat there three-quarters of an hour and he walked right past her knees. He probably thought her a new piece of furniture, although his whiskers worked a bit excitedly as he viewed her. He walked nearer and paralleled her left side. Slowly her hand crept nearer and nearer, but he was moving too and didn't see it. It touched his tail and with a bound he jumped between a tall stack of drawers and the wall, and started to climb. If he hadn't been such a feather's weight, or if the plaster hadn't been very rough, his toe nails couldn't have carried him up, but he succeeded in reaching the top of the case where he ran around despairingly. He was afraid to jump off. The hand was close to him. He squeaked. In vain, the hand had him! Back into the big cage went he, a most rebellious captive.

THE DESERTER AFTER HIS RETURN
One third of a year of age, he felt it time to see the world, and took his nest and bed with him

The babies were most delightful when they thought no one was around. When alone they made the room sound like a cage full of canaries, so sweet and clear were the trilling calls of the little flock. When one bothered another at an inopportune time, the result was a comical grumbling. Most of the scuffling that took place was over something to eat, and if one baby had a slice of banana another baby, who had none, would pursue him and by running sharply up and past him shear away the biggest portion of the slice. If one baby dipped his nose into the cottage cheese another baby was right there to nibble the end of it when he raised it, encircled with a festoon of cheese.

At night the babies helped Streak make their bed. They patted it with their paws and pushed it with their noses, bringing together all the stray bits until a great fluff of cotton stood in one corner. Mother Streak then carefully crawled in under to reappear in the center where she turned around and around, as though chasing the end of her long tail. The baby streaks followed her in or crawled over the top, as they preferred. The nest drew in with their weight until a dark spot in the center was all that was visible. When disturbed a sleek head raised itself and two gleaming eyes peered out over the fluff. If the menace was not too dreadful the head withdrew again, otherwise with squeaks and trills all the babies and Streak dashed madly about the cage. In the morning the family emerged, kicking the bed to pieces quite like a good housewife throwing back the bed covers that they may be well aired.

Daytime naps did not require beds. When sleepiness stole over them their eyes began to blink faster and faster. Their heads sank down, down, until their noses rested on the ground. The deeper asleep they fell the farther in went their heads until they were actually sleeping on the tops of their heads. Their feet vanished under the roundness of their sides. A bit of tail projected like a wee flag. In this position it was difficult to tell where a squirrel began or ended—they looked like so many enlarged potato bugs. It was impossible for them to hold this position and in a few moments one or the other began to slump sideways. Sometimes they fell completely over, waking up neighbors as they went. More often they just roused enough to straighten up, but in a few moments they did it again. When naps were ended how they stretched and to what unbelievable lengths, small pinky-white feet thrust as far as possible one after another, and such ridiculous yawns, showing their mouths and milky-white teeth.

For four months Streak and the babies amused the museum staff and then, since richest cookies and choicest fruits are no recompense for living between narrow walls, they were escorted by the Professor and the Lady-Who-Knows-All-About-Rocks out to a bit of charming virgin prairie where the door of the cage was opened and they were invited to touch real earth. The babies dashed out gaily, thoughtless, thankless, and beautiful, but little Streak lingered, wandering gently around the cage before appearing in the doorway. She nibbled a last seed from the Professor's fingers, then raced down the slope, and, with a happy trill disappeared in a cluster of purple vetch.

The last of the American Nature Association parties leaves for the field August 23, going to the Southwest to the Indian Country, Grand Canyon, Bryce and Zion Parks. There may still be time to join the party. If you have not had your vacation, wire for information. Also see announcement on Page 147 of this issue.

THE PREPARATION

The female beetle bites a slit in the bark in which to deposit her egg

Much more admiration might be spared for the intelligent and handsome apple tree borer did he not cause a loss to apple growers in the East of approximately one million dollars a year, and demand the annual expenditure of several hundred thousand dollars more to keep him from spreading. He is now holding his own, but further education on the pest is expected gradually to bring about decrease in his numbers.

LAYING THE EGG

She then turns, places her ovipositor under the bark, and the deed is done

HANDSOME ISN'T AS HANDSOME DOES

BY FRED E. BROOKS

PHOTOGRAPHS BY THE AUTHOR

DRIVING one April day through the hill country that overlooks the Shenandoah Valley in Virginia I passed a large commercial apple orchard in which a crew of six men could be seen following one of the long rows of trees. Two of the men were in advance of the others. One had a shovel and the other had a hoe, and with these tools they were removing litter and earth from around the trunks of the trees. Behind the two came the other workmen, who, close to each tree, knelt for a few minutes and then passed on to the next. My companion suggested that they were offering petitions to Pomona for a good fruit year. Inquiry revealed, however, that the men were at their annual task of ridding the trees of the grubs of a familiar beetle known as the roundheaded apple-tree borer. They called it "worming" the trees.

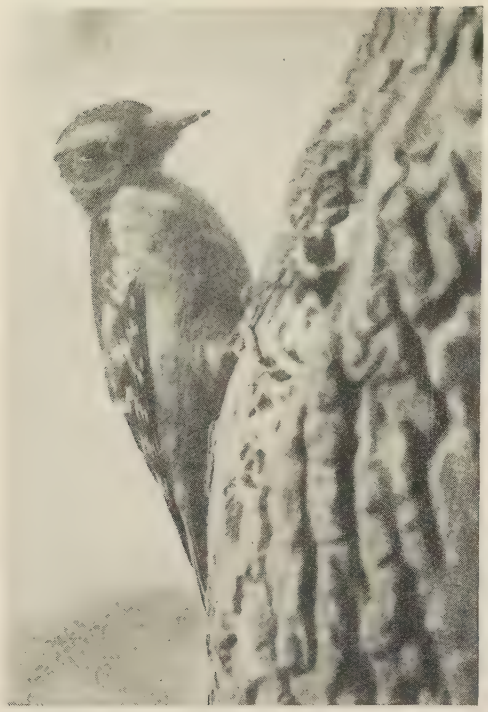
CAUGHT IN THE ACT

The female faces the world unabashed while she lays a cause of trouble in an apple tree

Among the ninety odd kinds of insects that seriously injure the apple tree and its fruits in the United States this roundheaded borer probably kills more trees than any other species. The insect is at home in southeastern Canada and from Maine and Minnesota to Georgia and Texas. In all this vast region any young apple, pear or quince tree that is planted stands an excellent chance of being stealthily attacked and most thoroughly killed.

The adult of the boring grub is an elongate, handsome, spick-and-span beetle, averaging three-fourths of an inch in length, and having long, graceful antennae, or feelers, which arch forward from the head. It wears a striped suit of cinnamon-brown and silvery-white. In the olden days when the doctrine of signatures was a part of the faith of those who tried to understand Nature's laws something suspicious might have been seen in this striped apparel. If the shivering leaves of the quaking-asp indicated that an extract made from the tree was good for ague, and if the yellow of the goldenrod was a sign that the plant could be used to cure jaundice, surely the striped garb of the beetle might reasonably be associated with a convict's uniform.

The insect dwelt here before white men came, and, probably, long before the Indians knew this country. Its original food plants, so far as we know, were crab-apple, hawthorn, mountain ash and service trees, all of which grew wild in primeval forests and glades. Trees of all these species are still attacked by the borers and they serve as an important means of distribution for the insect. When the early white settlers began to cultivate apple-trees from seeds and cuttings brought from Europe, the borer beetles soon recognized the trees as a new source of



A KNIGHT TO THE RESCUE

If it were not for the downy and other species of woodpeckers, the apple borer menace would be multiplied many times

food and set about breeding in them. We do not know whether they attacked the trees extensively at once, or whether there was a period during which they tried out and developed a liking for the new food. The chances are that they took to the apple-trees immediately. Insects of many kinds show a remarkable instinct for recognizing and appropriating for food purposes hitherto unknown plants belonging within botanical groups to which they are confined in feeding.

Next to nothing is known of the origin, evolution and ancient history of this borer. It is known that it early began to make itself known as an orchard pest in this country. Its family tree goes back to the family apple trees of a century and a half ago. In the year 1787 it received its scientific description and name, *Saperda candida,* from Fabricius, a noted Danish entomologist. From that time on mention of the insect as an orchard pest began to appear in print with increasing frequency. In the year 1825 an orchardist at Troy, New York, reported that he had lost several hundred young apple trees, which he valued at $2000, "the base of the trunks being literally honey-combed with the burrows of the grubs." Thousands of complaints of destructive attacks have been made since that time. Often fifty percent or more of the trees of an orchard are killed or made worthless by the borers feeding in the trunks.

The insect is interesting in its activities, and, were it not so destructive, we might work up a good deal of admiration for its wisdom and resourcefulness in making its way in the world. Its season of activity begins early in the spring. About two weeks after the blossoms have disappeared from apple trees, the beetles, which have now developed to maturity within the wood of the tree trunks, began to issue through round holes that they gnaw in the bark. The exit holes are usually less than a foot from the ground and they remain unhealed for several years as conspicuous evidence that borers have been at work.

Unlike the young of higher animals at birth, the beetles issue into the light of the world as mature creatures, capable of flight and reproduction, and, possibly, of a certain amount of mental activity. After emerging from the wood they crawl promptly up the trunk to the branches where they remain for several days. They feed sparingly on the bark of tender twigs and within a week begin to seek their mates and provide for offspring by laying eggs in the bark of nearby trees. In laying her eggs the female bites a slit in the bark, usually at the surface of the ground, and then turns and forces her tube-like ovipositor between the bark and the wood, depositing a slender, yellowish egg back as far as she can reach. She then withdraws her ovipositor, depositing in the opening a small mass of glue-like liquid which soon hardens and shuts out mites or other small enemies that might attempt to get at the egg. Sometimes a dozen, or even two dozen eggs are thus laid in one tree, the result being that as many borers are soon chewing up the wood and bark and playing havoc with it.

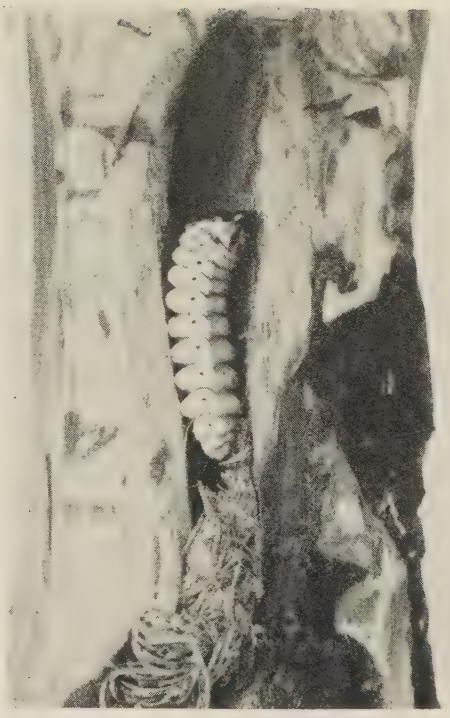
JUST OUT OF THEIR HOLES

These two beetles have just issued from the tree, after long days spent in darkness. They soon mate. The female, the larger, is on the left

The beetles are on the wing throughout the late spring and summer, this stage of the insect's life covering the most beautiful part of our year. The beetles know nothing of cold, unless they remember something of their sluggish existence through the winter while they were grubs in the trees. Whether they have any capacity for enjoying their escape from the darkness of their burrows into the warmth and sunshine of a new world can not be determined. They have no means of expressing pleasure that can be seen. I have seen butterflies and some other insects engaged in

happy play, but apparently these beetles are more serious-minded.

They are endowed with some intelligence—as much, at least, as a playful butterfly. In certain respects they know more than the average man. Not every person recognizes a service or a mountain ash tree when he sees it. Yet every beetle of this species knows the difference between a service and a sassafras, or a mountain ash and a black ash. They select unerringly the several kinds of trees, all belonging to one botanical family, in which to lay their eggs. Even the lowly grubs within their burrows in the wood know enough to make elaborate preparations for themselves, when they shall have changed their form. While in possession of strong cutting jaws, they tear strings of wood from the sides of their burrow and pack the material beneath themselves, making a soft bed on which to rest, and through which any accumulation of sap may drain away while they are in the helpless pupa stage. The grub gnaws an exit from its pupal quarters almost through the bark so that in its less efficient beetle stage, which is soon to follow, it may escape conveniently. It has sense enough to wriggle back into its deeper burrows when it hears a woodpecker tapping on the bark near its abode. Well it may, for woodpeckers go about seeking such morsels to devour, and are allies of the orchardist.



A REAL HOME SCENE

The full grown borer in its pupal chamber, with the bed of shavings for comfort and protection

WHY FARMERS DON'T GET RICH

No self-respecting apple tree is long going to stand for holes like this

I once planted twenty-four young borers in the bark of an apple tree in order to watch their development. A few days later I bethought myself of the danger to my insects from woodpeckers and returned to the tree with a wire screen covering. But a downy had beaten me to them and had drilled in and removed every borer. On another occasion I examined thirty-two newly-made pupal chambers in the trees of a neglected orchard. Thirty of the chambers were empty, their former occupants having been removed by woodpeckers. If these insects had all matured, and if half were females who laid their average twenty-three eggs, then the woodpeckers had reduced the prospective number of borers in that orchard from 368 to 23.

In an outdoor cage that I erected over an infested apple-tree at Demorest, Georgia, a beetle issued on May 8. At Munising, Michigan, one issued on July 23, just seventy-eight days between the appearance of the two beetles. In West Virginia the average time of emergence for two hundred and forty-four beetles was June 1. I had two females in West Virginia whose adult life covered sixty-one days, and another which lived fifty-eight days. The female beetles lay eggs as long as they are well and active, so that eggs are being deposited practically all summer within some part of the range of the insect. One female may be responsible for the borers that attack from a dozen to twenty trees.

Most of the borers spend either two or three years feeding and developing in the tree; a few individuals spend but one year in the tree, while occasionally one remains as a grub within its burrow for four years. In a lot of one hundred and twenty-one individuals which I kept under observation in West Virginia, two changed from egg to beetle in one year, one hundred and three made the change in two years, fifteen in three years, and one required four years for its transformation.

Orchardists who have this insect to deal with may very wisely do everything possible to encourage the presence of woodpeckers in the orchard. One woodpecker may save a dozen trees in a single year. A common practice is to "worm" the trees, with a knife and wire, once or twice annually. With proper care, the borers may be cut or wired out without much injury to the tree. October and April are good seasons for this work. It is probable that while the beetles of the borer are on the wing many of them are killed by feeding on the bark of twigs which have been coated with poison in the regular operation of spraying. This is a benefit which is often overlooked by those who apply arsenical sprays against curculios and the codling moth, and is an additional incentive to spray.

MOLLIE EYED US TRUSTFULLY

She learned to allow the children to approach within a few feet of her without moving

"MOLLIE"

EACH SEASON SHE RETURNED TO GREET HER FRIENDS

BY JOSEPH BALDWIN HALM

PHOTOGRAPHS BY THE AUTHOR

I FIRST saw Mollie one bright May morning three years ago while picking my way through the barbed wire of Joe's pasture fence. The pasture and adjacent land where our lodge was located belonged to Joe, who had come to Montana in the early days and settled in the Flathead Valley, near Nine Pipes, a large man-made lake. Prompted by his love for wild life, he had permitted this pasture to go unused and become a nesting place for birds—a sort of annex to the National Bird Refuge around Nine Pipes.

As I was freeing myself of the barbs, there was a whir —a duck left the ground and flew low, headed for the lake. I looked about, and there on the ground among the grass, wild asters and larkspur, was a most wonderful nest, inlaid with the softest, downiest feathers from the mother's breast. Startled by my intrusion she had not taken time to cover her eggs as I later found she usually did when leaving the nest. My untrained eye took in the situation—"Must be a mallard."

This is another delightful story of bird life about the National Bird Refuge nestling around the artificial lake of Nine Pipes below Montana's towering Mission Range. Mr. Halm is a forester in the U. S. Forest Service stationed at Missoula, and the birds are his hobby

My wanderings, an hour later, brought me back to the spot. Slowly and stealthily I walked toward the nest, hoping to find the bird had returned. When perhaps ten yards distant, I saw her hastily leaving the nest and creep away in the weeds and grass. A moment later she took wing and I caught a glimpse of her broad heavy bill. It was a shoveller. Flying to the farther pasture fence, she wheeled and came back, passing less than forty yards away, headed for Nine Pipes.

In succeeding days we saw her often, until one day she was gone, the little nest a confusion of scattered feathers and shells. Two or three days later we came upon the little mother and her brood in a small pond nearby. At first glance, ducks of the same species all look alike, but we soon know them by their individual characteristics and traits as in the case of animals and humans. So we learned to know Mollie from the several other spoonbills in the neighborhood. We all knew her by name; even our three-year old called her Mollie.

We often watched the little family splashing and tipping up while feeding in the shallow water, or saw them winding single file through the grass, following their proud little mother overland to some neighboring pond. If Mollie was not a widow, she surely played the part, for in all my wanderings I never met her mate.

The next spring, I again visited the old pasture, and looked hopefully toward the place where the nest had been and where I had first seen Mollie. My heart gave a bound—was that——? Yes, there she was, head low, slipping through the grass. As she took wing, her every movement revived old memories. It *was* Mollie.

A short distance from the site of the old one, I found a mate to the beautiful nest of the previous year. I visited the nest several times. The children saw her almost daily. She became so accustomed to the three little visitors that when they would halt some fifteen feet from the nest and talk to her, she would not move, but would eye them trustingly. If I came with them she seemed more timid and was almost sure to fly.

One day she abandoned her nest. We came upon her in a tiny pond teaching eight babies the rudiments of the tip-up game. As the summer wore on we gradually won their confidence. When we came near they seemed unafraid and friendly. Seven of Mollie's ducklings lived to maturity and it was with some regrets that we saw them leave the little ponds and fly to the big lake to return no more.

Toward the middle of May last year, we again returned to Nine Pipes to make more pictures and resume our studies of bird life. The children wondered if Mollie would be back. I thought it hardly likely, but shouldering

my camera, I once more trod the familiar old pasture. I had a pleasurable feeling of expectancy which turned to disappointment when the familiar form of Mollie did not flutter away. I looked about among the grass and flowers, but saw no sign of a nest. That afternoon as I returned, the three children met me breathless and excited, all talking at once. From the confusion of exclamations, I gathered that Mollie was back, but someone or something had destroyed her eggs. I followed the excited children through the fences to the pasture. There, but a few feet from the site of previous years, and almost directly where I had passed that morning, was the same dainty and orderly nest concealed in a clump of asters. She possessed a sense for rare esthetic beauty and I knew it was Mollie's even though I had not seen her. I could make out three greenish buff eggs barely visible through the covering of feathers. Scattered about five or ten feet away were four more eggs. Something or someone had taken those eggs from the nest. It could hardly have been a coyote or a bird for the nest was unharmed and the eggs unbroken. In a fire camp once I had watched two weasels carry away and hide an entire layer of eggs from a crate, by holding them between forelegs and chin. But these marauders were evidently not weasels for they would undoubtedly have stolen all the eggs and hidden them.

THE "MOST WONDERFUL" NEST

Deep in the grass, wild asters and larkspur it lay. Mollie had not had time to cover it

ONE DAY SHE WAS GONE

And her nest was a confusion of scattered feathers and shells

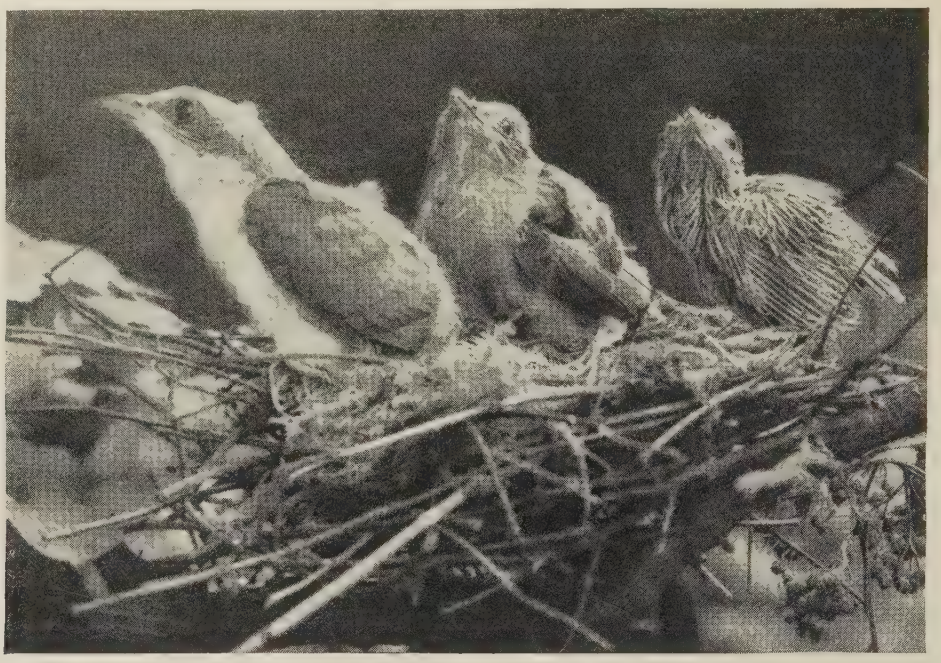
As I was pondering the matter, Glenn, our youngest, exclaimed, "Oh, lookit—'ere's Mollie." "Yes, s-i-r, sure that's Mollie," echoed the other two. I turned in time to see the familiar form sweeping by. Could she reason, would she think that we were the guilty ones caught in the act? I felt a little twang of pain at the thought.

As I walked toward our little lodge, the sun was giving the rugged snow-capped peaks of the majestic Old Mission Range a final caress. The children, laden with the spoils of the field, were running ahead shouting to their waiting mother. I vowed to spend a day or a week, if necessary, to catch the depredator of Mollie's nest.

The next morning I went alone to the pasture and stooping low, followed a slight depression. Not wishing my presence to be suspected, I crawled into a thicket of wild mustard scarcely twenty yards from the home in the asters. With the aid of my binoculars, I could see Mollie on or near her nest. She seemed uneasy, occasionally tilting her head as if eyeing the weather. Possibly she had heard me. I slunk even lower behind my wild mustard blind. I had arrived at the opportune moment, for presently she crouched, lowered her head slightly, became rigid. I imagined I could see her feathers bristle. Something was moving in the weeds just beyond. I recklessly raised my head, but Mollie was too intent on the moving grass to notice. She seemed to swell in size, very much like a brooding hen. She was moving forward ever so slowly, her neck extended, her large bill pointing like a setter. Stealthily as a snake she moved, not a blade of grass stirred. She crept nearer and nearer, then like a flash she shot forward. Timid little Mollie had struck the unsuspecting thief and sent him sprawling into the grass. Following up her advantage she jabbed again and again with her heavy bill. The surprised animal, a huge Columbia ground squirrel, now on the defensive, was on his back under the weeds fighting with claws and bared teeth. With head low, she rushed at him, emitting a sort of hissing sound, her mandibles snapping fiercely. So quick was she that the animal seemed unable to regain his feet. When he did he ran streaking through the grass and under the fence out of sight. I was so absorbed in the

little drama, I had not moved. Mollie, without so much as a look around, paused and shook herself, then waddled to her nest where she busied herself a moment, and was off for the lake.

The following day three determined and vindictive little vigilantes marched proudly across the fields armed with six new gopher traps. Revenge tempered with success was sweet. By September the casualty list in the enemy's camps numbered nearly one hundred ground squirrels and several weasels. Mollie must be protected!



THE YELLOW-BILLED MOTHER PUTS ONE OVER
And the black-billed cuckoo had to rear her baby, the jaunty fellow on the left

AN UNUSUAL CUCKOO FAMILY

BY HUGO H. SCHRODER

ILLUSTRATION BY THE AUTHOR

While on a Nature ramble on an August day some years ago, I discovered a nest of the black-billed cuckoo in a small tree about eight feet from the ground. The nest contained three young birds in the pin feather stage and one egg. Two of the young birds were of about the same size while the third was somewhat smaller. No other difference in appearance of the young was noted at the time and as we thought that it was just an ordinary nest of the black-billed cuckoo no effort was made to photograph it or to watch the growth of the young.

On a field trip some days later I inspected the nest and found that this was not an ordinary black-billed cuckoo family. A yellow-billed cuckoo had deposited an egg in the nest, imposing the burden of bringing up her baby upon Mrs. B. B. Cuckoo.

There were two youngsters in the nest, one in the quill stage and the other just a few days old. Perched near the nest was a youngster in full feather—this was the yellow-billed cuckoo baby getting ready to leave the home of his foster parents. Looking around for the fourth member of this unusual bird family, I found him on the ground under the tree. Here then was an illustration of the incidents, described by various ornithologists, of one species of cuckoo depositing its eggs in the nest of the other species, leaving the duties of incubation to the foster mother.

I had no camera with me and was about a mile from home. Not daring to leave the two fully feathered foster brothers for fear that they would again leave the nest and be gone by the time I could get back with a camera, I took the two with me, placing them in a box which I found on the way home, then after getting my equipment, returned them to the nest, for the pictures.

The photograph shows the difference in coloration of the two species, the yellow-billed youngster being white underneath while the black-billed is darker. It also shows the different stages of growth of the young birds. The eggs had evidently been laid at rather irregular intervals for the smallest youngster was only a few days old and unable to hold up his head at the time the photograph was taken. He is occupying the center of the nest, only his back showing above the rim of the nest. This case reflects the European cuckoo's usual habit.

YELLOW-BREASTED CHAT—*Icteria virens*

YELLOW-BREASTED CHAT

These are among the few birds that sing at night. Their song, a medley of whistles and calls, may be mistaken for other birds but for the occasional "Cha Cha Chat" which betrays the real musicians. In the dense brier tangles of lowland brooksides or swampy lands, the nest is placed about three feet from the ground. This is made of coarse grasses and grapevine bark, with a lining of finer grasses. The eggs, three to five, may be pinkish, greenish or clear white, glossy and blotched with reddish brown. If disturbed or if a cowbird egg is added, the birds may destroy the whole clutch by piercing the shells. The birds are shy and elusive, but may be seen if an observer remains quiet and squeaks softly. Their curiosity aroused, they may even mount to a near-by perch and sing. Chats spend the summer all across the United States, the Yellow-breasted east of the plains, and the Long-tailed from there to the Pacific Coast. They spend the winter in Vera Cruz, Yucatan and southward to Mexico and Costa Rica.

PROTHONOTARY WARBLER

These active warblers are birds of the southland, ommon in flood plain areas of brooks, or swampy land om Virginia to northern Florida and the bottom-lands ong the Mississippi River and its tributaries. They id their food on mossy logs in low thickets, always ear water. The name golden swamp warbler would em especially appropriate and descriptive. They use d holes of woodpecker or chickadee for nests and have en known to accept boxes placed for their use. The ale sometimes carries material to the entrance, but e female does the job of placing the moss and leaves d weaving the grapevine bark into a basket-like ing. There are usually six glossy, cream-white eggs hly marked with chestnut-red and lavender, especially avy around the larger end. The nesting season is ring May and June. They spend the winter from caragua to Venezuela. The Atlantic States birds avel by way of northwest Florida and a seven ndred fifty mile flight across the Gulf of Mexico.

PROTHONOTARY WARBLER—*Protonotaria citrea*

SWAINSON'S WARBLER—*Helinaia swainsoni*

SWAINSON'S WARBLER

These are rare warblers, birds of swampy regions along the Atlantic Coast from Dismal Swamp in Virginia to northern Florida, the Gulf Coast and west to the Mississippi River. They hunt for beetles and other small forms of insect life in the dark, tangled growth and fallen leaves near the water. They glide from branch to branch in graceful flight, and walk about rather than hop. They build a very large, bulky nest of wet leaves of oak, cane and sweet gum which looks like a bunch of old refuse caught in the top of a cane plant because it is made with the leaves, stems upward, and lined with needles of pine. From early May through July these birds may lay their three creamy-white, rather dull, unmarked eggs, which are usually quite pointed at the smaller end. These warblers were first discovered by Bachman in 1832 near Charleston, S. C., but it was more than fifty years before anything was known of their habitat and habits of living. They spend the months from October to April in Jamaica.

MYRTLE WARBLER—*Dendroica coronata*

MYRTLE WARBLER

These rather conspicuous warblers nest almost to tree limit from Alaska to Labrador and south into the northern part of the eastern United States. They spend the winter principally throughout southern United States to Central Mexico and Panama, Greater Antilles and the Bahamas. They travel slowly and in the eastern United States are often seen in flocks far north of the winter range of other warblers, feeding on insect eggs, spiders and beetles found about houses and in hedgerows or scrubby growth where bayberries abound. The nests, placed from four to twenty feet up in small coniferous trees, are bulky affairs of twigs and dried grasses, with lining of rootlets and many feathers. The three to five eggs are dull creamy white, spotted with shades of reddish brown and some purplish black, often thickened into a ring around the large end. The winter plumage of the males is similar to the brownish coat of the females. Their white throats distinguish them from the Audubon warblers of the west, which they closely resemble.

BLACKPOLL WARBLER

From their winter home across the whole of northern South America, and casually to Chili, these beautiful little birds are of the few to follow the West Indies from island to island and north through Florida on the way to their nesting home in wooded Canada. Many breed in the mountains of our northeastern states. A few have been found even in Greenland. No Blackpolls have a migration journey of less than twenty-five hundred miles in length and those nesting in Yukon must go five thousand miles. They arrive in Florida late in April and to reach Alaska at the usual nesting time must travel not less than seventy-five miles a day. Their nests, warmly lined with feathers, are built of grasses, lichens and twigs in the thick of small spruces usually from two to four feet from the ground. The five eggs are speckled and blotched with browns which form a wreath at the large end. During their leisurely migrations these warblers are very abundant and, on their southward journey, they pass through Florida again in November.

BLACKPOLL WARBLER—*Dendroica striata*

MACGILLIVRAY'S WARBLER—*Oporornis tolmiei*

MACGILLIVRAY'S WARBLER

These warblers were discovered in 1839 by Townsend and named by him in honor of Dr. W. F. Tolmie; they were later renamed by Audubon for Macgillivray whose name they now unjustly bear. They are very common summer birds of the foothills and valleys of the west from British Columbia to South Dakota, and south to Arizona, and they winter from Lower California to Colombia. They are shy and love the underbrush of sunny hillsides. The nest is placed in some low tangle from six inches to two feet above the ground. The eggs, usually four, blotched and spotted on the large end with several shades of brown and lilac, are laid in a well rounded cup of fine rootlets and grasses, lined with horsehair. During the ten days the babies are in the nest both birds tirelessly fill the wee yellow-rimmed mouths. Until occupied by young, a discovered nest must be left absolutely alone or it will be abandoned by these shy parents. They will come inquisitively about a quiet observer but, when followed, magically disappear.

AUDUBON'S WARBLER

The field marks of these beautiful warblers of the cific slope are the strong body marks of black and ite, while the crown, throat, rump and sides are lowish. They breed from British Columbia to thern California and east to the plains, and spend winter from the Columbia river south to Guatemala. ey range from high mountain tops to the lowest leys. The bulky nest of weeds, fir twigs, grass and ss, usually placed in fir trees, is generally lined with rs from horses' tails. The eggs are three to five, ally four, with color varying from dull white to enish or bluish, blotched with brown or lavender. Oregon they glean, in company with goldfinches and kins, among the dried weeds, gathering spiders and er insects stowed therein for the winter. Often one mpses a flash of white in the tail and wings as the ds dart about, flycatcher fashion, after insects. Their g is a weak, though pleasing, warble insistently eated. In habits they resemble myrtle warblers.

AUDUBON'S WARBLER—*Dendroica auduboni*

BAY-BREASTED WARBLER—*Dendroica castanea*

BAY-BREASTED WARBLER

These leisurely-hunting warblers appear generally dark all over except for the buffy white patch at the side of the neck. From their winter quarters in Panama or Colombia they migrate directly across the Caribbean Sea and the Gulf of Mexico to the Mississippi valley. Thence they spread out northward to Saskatchewan, Hudson Bay and Newfoundland. They frequent dense woods, preferably the evergreens among which they place their nests. These, composed of fine twigs and the lichen, *Usnea*, lined with fibrous fern rootlets and moss setae, are placed on horizontal branches above twenty feet from the ground. The three or four eggs are bluish green thickly spotted all over, the markings converging into a ring at the large end. These are classed among the rarer warblers, doubtless due to their habit of migrating in wide-spread flocks through the tall tree tops, where their dark coloration works for their concealment. During fall migration the immature bay-breasted warblers closely resemble young of the blackpoll.

MOURNING WARBLER

There are but minor difference between this species l Macgillivray's warbler; the lack of an eye ring, re yellow in the olive on the back, and possibly less ck about the head and chest mark the Mourning. wever, their habitats nowhere overlap except when h are spending the winter months in Central America. migration their distribution is fanwise from the res of Louisiana and Texas to Minnesota and along western side of the Alleghanies to Nova Scotia. ey are most common during the summer along the thern limit of their range of two thousand miles east l west. Among the last to arrive, they are also the t to leave their summer home, and are nowhere ndant. They frequent scrubby growths and build ir nests of strips of bark and grass, thickly lined with ck rootlets and horsehairs, from six to twenty inches ve the ground. There are four eggs, white, sparingly tched and spotted with tones of red-brown. During ting time the male's sweet song may often be heard.

MOURNING WARBLER—*Oporornis philadelphia*

NORTHERN WATER-THRUSH

Along the mossy wall above a bubbling mountain brook these warblers build their nests of twigs and moss so much like the surroundings that they are not easy to find. The setae of polythrichum, pigeon wheat moss, are used to make the lovely brown interior. Late in May or early in June there are four or five eggs profusely marked with rufous and lavender-gray over a creamy white tone. The songs of these birds are loud, musical expressions of the spirit of wildness, and during migration may be heard from several directions at once in some dense, thicket-covered spot not too far from a waterway; or they sometimes wander upland to appear and stay for several days in shrub-covered gardens. They spend the summer in the Canadian zone of eastern North America from northern Ontario and Newfoundland, New York, New England and the mountains south to West Virginia; and the winter through the West Indies, Valley of Mexico, eastern coast of Central America, Panama and northern South America.

NORTHERN WATER-THRUSH—*Seiurus noveboracensis*

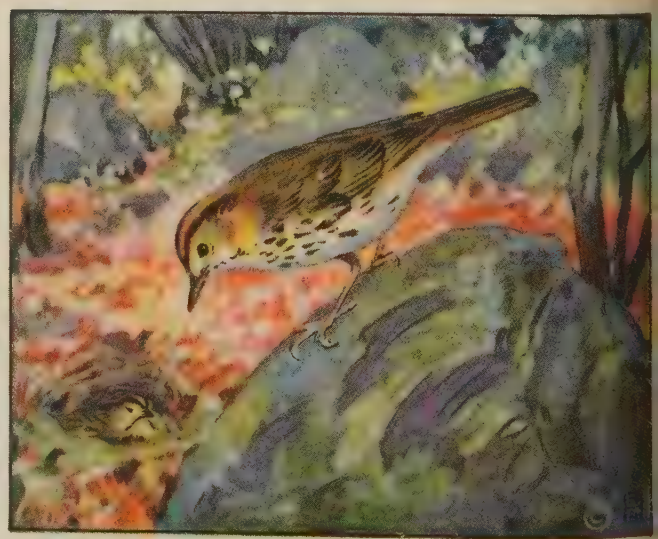
LOUISIANA WATER-THRUSH—*Seiurus motacilla*

LOUISIANA WATER-THRUSH

These warblers breed throughout eastern United States to just beyond the Mississippi River, and winter from Mexico to Colombia, in most of the West Indies, and the Bahamas. They are among the shyest of our birds and live only in lowland forests or wooded hillsides along rapid streams. They seek their food on the muddy banks and among the moss-covered logs and thick growth in the jungle-like bottom land. While walking, perching or feeding, they teeter constantly, the long tail emphasizing the action. Frequently they pause upon a low branch over the water-way to sing their wild, clear, ringing song, with its characteristic closing twitter, then off through the dense undergrowth out of sight. They place their bulky, loosely-built nests in hollows under overhanging banks. The five eggs are creamy-white, variously marked with browns and grays. The male has been known to feed the female while she is incubating, ever on the alert and ready to distract the attention of any possible intruder.

OVEN-BIRD

On the ground of a wooded hillside or in the undergrowth of swampy forest land, these birds build their bulky, dutch-oven nests with entrances at the side. These are so buried in the surrounding leaves that they are seldom seen. Within, the nest is lined with bark strips, weed stems and a little horsehair. There are four or five glossy white eggs which are beautifully wreathed and mottled with tones of brown and lavender. During the spring nesting time we hear their "Teacher" call almost constantly, especially if we happen near the nest. But when the family is able to look out for itself the song is stilled and few of us recognize their short, sharp calls as they scratch for food among the leaves upon the ground beneath the undergrowth in our woods. They step daintily about with tail raised, but, unlike most of their relatives, they do no tail wagging or courtesying. These warblers are found nearly to tree limit in Canada and Yukon Valley, Alaska; to the eastern base of the Rockies, thence through Kansas, Ohio and Virginia.



OVEN-BIRD—*Seiurus aurocapillus*

THE HOLLOW WALL GARDEN IN THE SPRING

Most of the blooms are yet to come, but there is a lot of work to do. Notice the stain, middle left, caused by the drip of the flower-pot percolator

HOLLOW WALL GARDENING

A NOVEL AND AMUSING TYPE OF FLOWER-GROWING

BY FRANCIS HEATHERLEY

Hollow wall gardening, as an exercise, comes somewhere between cricket and crochet, possibly nearer the latter. Moreover, it is essentially a poor man's hobby, for the materials it requires are old bricks or building stones. And what is more, it is a rare type of horticulture that is sometimes read about but seldom seen.

Even the famous Kew gardens contain no hollow walls; yet my back yard has two of them, which are the result of an interest aroused about nine years ago. They consist of two tiers of bricks with soil in between them, and plants growing in crannies in the mortar and covering the outer surface with radiant hues. Just how radiant the hues are depends upon the season, the luck, and the number of worms and insects that have found a hollow wall garden an excellent home.

We have never heard of hollow wall gardening in the United States, but so attractive does the idea sound that we are going to begin in the fall. This form should be very popular, and we will be glad to hear of the successes—and failures—of our readers

My first hollow wall was built between two of the buttresses of the back wall of my garden, and owing to its shape, and from the time I spent before it, it was called by an irreverent member of my family, "father's altar." It was somewhat of a failure, for not only was its aspect due north, but an old coach-house towered above it a few feet to the west, keeping rain and direct sunlight off it. I have since found that the only hopeless position is in the shade, or under the drip of a tree or building. And besides, I had added fine garden soil to the mortar to make it crumbly and easily pierced for the introduction of plants, with such success that after a long frost the bricks became as free of anchors as a saint of sin.

So I built two others, much after the fashion of Hydra, who after losing one head grew two. Now, the ideal site, I discovered, was between the flower garden and the kitchen garden, to screen from view various unsightly details. In my garden, however, a tall privet hedge fulfilled this purpose to my wife's complete satisfaction; moreover, she considers that my tendencies are destructive and that I am unjustly prejudiced against privet. As an alternative to the position I wanted, I got her consent to construct my walls to form an alcove in which she could

sit in more privacy than in the rest of the garden. I had plenty of bricks, owing to the presence of a pigsty in the back garden—a dilapidated monument to the strictly utilitarian ideals of some former owner.

My early experiences were sad. The literature on hollow wall gardening is almost as rare as the gardens themselves, and seems to be little based on actual experience. Throughout all of it runs optimistic chatter regarding how happy choice alpine plants find themselves in such a garden. It reads as hearteningly as anything that ever came out of a seed catalogue; but I am afraid I cannot subscribe to its truth. I dare not, in view of all those choice alpine plants I sent to their death at the beginning. But plants that can stand a dry régime, I discovered, thrive, and it is to these that the hollow wall gardener must turn if he wishes to practise this delightful art with success.

SAXIFRAGE AND COLUMBINE

Dwelling in health and amity. They furnish tangible evidence of the possibilities of hollow-wall gardening

There is no difficulty in building the wall itself. Portland cement is more satisfactory than ordinary mortar because more gaps can be left than would be safe with the other. A good proportion is one of cement to three of sand. There was no jerrybuilding about my walls, considering that they were begun in autumn, continued by fits and starts during the winter, and finished in early summer. Leisurely procedure allowed me to improve in my methods. Cement can be handily kept in coffee tins with a push-in lid, and will stay dry and powdery for years. A small repointing trowel is handier than a full sized mason's trowel. A plumb line and spirit level are useful, the latter only to insure that a newly-laid brick is level in its long diameter. There should be a slight inward tilt to its short diameter to encourage the inward seepage of rainfall. The wall should be a little wider at the foot than at the top, so the rain will soak in and not just run off.

There are four principal ways of stocking a wall with plants. Seeds, cuttings, offsets and entire plants may be used successfully. The entire plants are suitable, however, only whilst the building of the wall is in progress, and only the smallest plants, with roots the longer the better, are preferred. After as much soil as possible has been washed away, the roots are spread across the bricks on which they are laid so that they reach the interior. The bricks with which the plants are to be covered should not be laid until the roots have been dusted with a thin cover of leaf mould and weighted down with something heavy, to keep them from falling out, and these bricks should not be cemented to their neighbors for a day or two, until the roots have had a chance to catch.

Owing to their expensive mortality, and the awkward large holes left in the wall by their death, I early gave up using adult plants, even before the wall was finished, in favor of planting any alpines intended for the wall in a specially raised bed,

THE DRY-LOVING TYPES SUCCEED BEST

Here are Cheddar pink and Veronica amethystina proudly waving their blossoms from the end of the wall

THE TOP FORMS A LEVEL GARDEN
Here Iris and other plants that fare poorly below will add an attractive note

after the style of a rock garden. Those that survived were introduced to the wall in the form of offsets or cuttings—thus illustrating a way to eat your cake and keep it.

All the earth is first washed off the cutting or offset, and whilst it is soaking, a stick, the thickness of a pencil, is driven four or five inches into the wall, and the crevice, if need be, enlarged with hammer and chisel. Then grit, made of smashed clinkers, is rammed in as a deterrent to earthworms, until the cavity is just about half an inch deeper than the cutting. Then the ram is driven into the wall alongside the opening to cause the tunnel to collapse, and earth is carefully poked in to completely block the hole.

The sowing of seed is, next to planting, the least satisfactory method, for if the wall is examined some evening when slug hunting is in progress, it will be found that the earthworms are in the habit of protruding from all available cracks and crannies in order to browse on the invisible algae on the surface of the wall, and in so doing, push out any obstruction. Much more satisfactory is the planting of seedlings, which are introduced in a manner similar to the cuttings and offsets, except that a strip of a visiting card, about 3″ x ⅛″, is useful to pass the seedling into the hole until only the leaves, but hardly any stem, protrude.

If the winter is mild, here in England, additions can be carried out all the year round.

YARROW IN FULL BLOOM
One of the plants that thrived and rewarded the work. It is best planted from cuttings

PLANTED IN THE INTERSTICES
Each foot of the wall should bloom with alpines such as this Saxifraga cotyledon, which seems to have staked off a claim for itself

The most unfavorable season is a spring with searching winds. As I live in what would hardly be considered a favored clime, greater success than I have enjoyed will probably be achieved quickly. My garden is in an eastern suburb of Manchester. With factories and collieries on every side, it is not an ideal situation for alpines. The prevailing winds are westerly, but it is neither high winds nor severe frosts which convert my hardy perennials into annuals, but just two or three muggy days during the winter when gentle zephyrs bring us Manchester's superfluous wealth. The smoke hangs over us like a pall, turning day into night and from it descends a gentle drizzle which would probably turn blue litmus paper red and which converts some of my cherished hopes into the semblance of yesterday's lettuce with the salad dressing left on.

When inserting additions to the wall in warm or dry weather, I try to insert them roughly in line from above, and then keep that part of the wall damp for a week or so by means of a percolator on top of the wall, which I keep going provided I happen to remember it.

To make a percolator is an art. I take a

sound five-inch flower-pot and make a hole in its side about an inch from the bottom with gentle but rapid tapping on one spot with a hammer and a 3″ French nail. If I manage to do this without breaking the pot, I proceed to close the hole in the bottom with cement and a piece of slate. A few days later, the pot can be filled with a mixture of grit and soil to above the level of the side hole, placed in position, and filled with water. If the flow is too free, the soil inside should be pressed down; if the water is dammed up, then is when the wooden match comes in.

Numerous weeds find the garden as attractive as one that is level, and they require a part of the total sum of attention, which, incidentally, is about five times greater than that needed for a level garden of the same area. Self-sown plants may be left in until fairly well-grown, unless living in the same hole with a legitimate occupant, and dislodged later to furnish a suitable spot for a cutting. In fact, its crevice should be given preference over an empty one nearby, as it indicates that a plant will grow there. If the weeds are unsightly, however, the redundant holes may be filled with a mixture of one part cement to six parts earth.

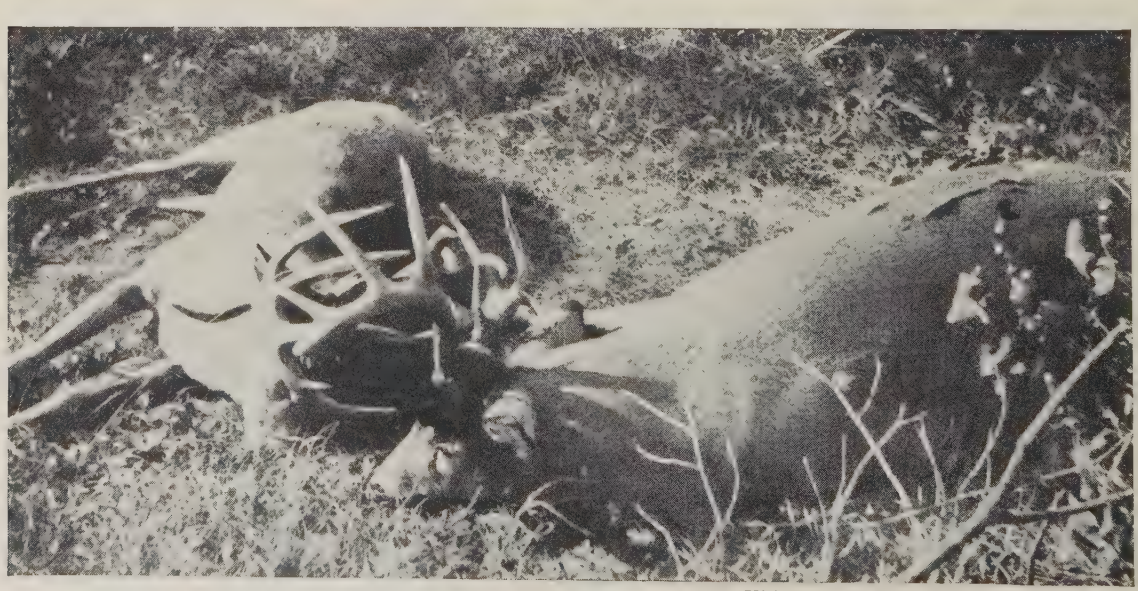
The choice sites on a wall are along the two or three upper tiers, for the soil is more moist here, and there is less danger from slugs. In fact, I planted the dwarf irises on the top, and raise irises and lilies there from seed, while both plants die from slugs in the lower sections.

Though slugs are bad enough, an enemy against which I am powerless is a root-feeding caterpillar which causes, I believe, many of my summer fatalities. A round cake of encrusted saxifrage instead of clinging to the wall gradually gets loose, withers and drops off. The cause is revealed in early spring by the shiny reddish brown pupa wriggling to the surface through some hole in the wall where it remains a variable number of days until the moth emerges. Having heard that Scolopendra, the centipede, is purely carnivorous in its diet, I conscript it wherever found, for duty on the walls.

THE UPPER TIERS ARE BEST

As this healthy growth of varieties of Aizoides and Saxifrage indicate

It is strange that this style of gardening should be so little practiced. There is a good deal of stooping in ordinary gardening, which becomes irksome with advancing years, and most wall gardening can be done sitting on a chair or stool. The effect of growing plants blooming on the level with the eye has attractive qualities all its own. And the problems of wall gardening are such that the greatest fun in playing with plants—which is working out difficult situations, and seeing the solutions succeed—is to be enjoyed practically all the time. Except, of course, when your plants fail to enjoy their homes. Then you chant a silent, sorrowful requiem, and send down to the nursery for more plants.



COURTESY, WISCONSIN CONSERVATION COMMISSION

A TRAGIC BATTLE FOR HERD SUPREMACY

Death alone won. One buck died of a broken neck; the other had to be shot. For several hundred feet they had torn up the ground, broken the underbrush, and trampled the grass

TAMING THE CATBIRD

HOW A "WILDING" WAS MADE LESS WILD

BY FRANK BOND

ILLUSTRATED BY GARNET JEX

IN OUR bird sanctuary in Cleveland Park, Washington, D. C., is a fine spiraea bush, close to the sidewalk and about fifteen feet from the drinking pool, and there it was a pair of catbirds, last spring, said "evers". Within its shaded and well-concealed center they constructed the customary catbird summer home.

They were just ordinary catbirds, which swell up and look oddly threatening during the mating season or emit a prolonged "m-e-w" suggesting their namesake, the housecat, or a sharp "quirt-quirt-quirt" when a cat actually comes around. But they were fully appreciative of the meat and drink the bird cafeteria of our sanctuary—which had just reached its majority—afforded. Perhaps in a wild bird way they understood my responsibility for it. At any rate, they allowed me to come within a few feet of them every day, and since I cultivated a quiet, undemonstrative attitude toward them and their family-raising ambition, they became almost indifferent to my presence.

SHE TOOK MORSELS FROM FINGER TIPS
Nor did she mind when her throat was gently stroked, or her nestlings viewed by her friend

The completion of the nest was followed by a clutch of the customary bluish green eggs and a most promising period of incubation. During this sitting period the immediate vicinity of the spiraea bush was patrolled frequently and its shady recesses closely inspected even to the extent of gently parting the hanging "bridal veil" to the end that the female might learn fully that neither herself nor her treasures were in danger.

In the early morning of a day when the incubation period was believed to be over a peek into the bush disclosed lady catbird partially risen from the nest and intently examining its contents just beneath. It was certain that she had heard something unusual, even if expected. No doubt it was the pipping of the egg-shell just below her breast for she continued this inspection while scarcely noticing the human intruder only two feet away.

The slender twigs of the spiraea bush just seemed to invite the experiment which immediately followed. Gently, with great deliberation, accompanied with whistled catbird song notes, I gradually made an opening so that with the help of the twig the nest could be reached without an alarming disturbance of the foliage. The twig was tipped with a small but as attractive a piece of suet as the cafeteria afforded. This tidbit was offered several times with gentle speech and whistling notes and finally when it touched her bill she seemed to see and understand. She transferred the suet from the tip of the spiraea twig to her hungry crop in one quick and effective operation, and the taming of the catbird was well on the way.

She was not again disturbed until evening but you may be certain that the regular office worries of that day were more irksome than usual and that the return home was followed by an immediate renewal of what might be called a mutually satisfactory understanding. The bird took several pieces of suet from the tip of a twig only about three inches long and the next morning she fed from the finger tips and allowed a gentle stroking of her throat. When gently pressed, she partially arose in the nest, uncovering the full complement of small and homely nestlings in place of the eggs that were.

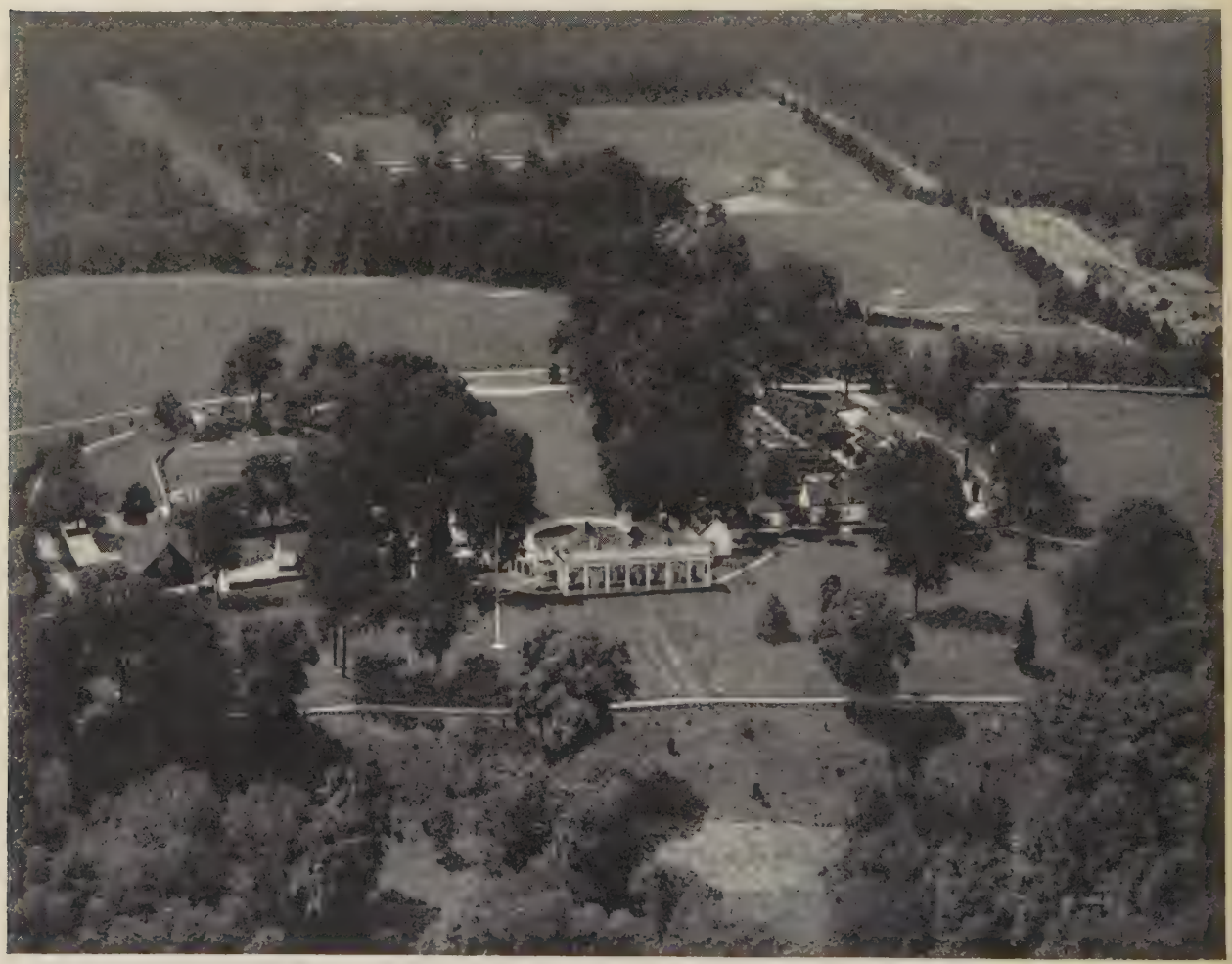
From this time on was a period of increasing activity on the part of the catbirds toward the cafeteria supplies. The daily bathing facilities were especially appreciated. I assiduously cultivated the attractive boarders until the mother would come down from the branches of the elm overhead or from the oak nearby, take a piece of suet from the hand, and allow herself to be stroked gently on the top and back of the head and on the throat and breast. She was almost as tame as a bantam chicken that has been an intimate member of a human family since the day it pipped the egg.

Appreciative neighbors who called to see the "wild bird" come down from a tree top to feed from the hand and be gently stroked said it was uncanny, but to me the

taming process does not seem to need much explanation.

One thing occurred, however, which might be charged to the intimate relations existing between this wild bird family and the owner of the cafeteria, and that was the premature abandonment of the nest by the whole frowzy brood two or three days before they should have gone or probably would have gone under normal conditions. Without reason or visible justification of any kind they exhibited an apparent precocity and self reliance due, possibly, to the absence of that fear of man which, unfortunately, is the common wild life heritage. They were found one evening out of the nest, unable to fly more than two or three feet and when returned to the nest where they belonged absolutely refused to remain. They were placed in the denser top part of the nearby privet hedge again and again, until darkness discouraged further adventures. There they were left with much misgiving because of prowling cats. Early the next morning they were moved to higher places in the nearby trees and shrubbery and so far as known all survived.

In the following spring, a catbird took abode in the elm tree just above the spiraea bush and appeared less afraid than the rest of the spring arrivals. I went under the tree, whistled softly and held up a tempting morsel of suet and the bird came down, closer and closer; but the six months of wintering in the far South and the long disassociation with the human kind prevented her from coming nearer than half a foot. Though neither parent was banded for future identification, there can be little doubt that this was our tame catbird of the year before because a wild catbird without an experience with human beings similar to hers would never have been so friendly.



© FAIRCHILD AERIAL SURVEYS, INC.

WASHINGTON'S MUCH VISITED HOME FROM THE AIR

Delightful Mount Vernon, framed in its trees, is testimony to the love of beauty that was part of the nature of the First President. Many of the forest monarchs surrounding the beautiful colonial dwelling were planted with Washington's own hands or under his direct orders. The great leader willed the estate to Bushrod Washington, and eventually it was secured by the Mount Vernon Ladies Association, which keeps it open as a shrine for thousands of Americans. Immediately in back and to the right of the house are the famous gardens and boxwood hedges, and at the left, the stable and carriage house. The terrace in the foreground slopes down to the picturesque Potomac. Washington's tomb does not appear in this picture, but is located just below the road seen at the left. Mount Vernon will be a center for the George Washington Bi-Centennial in 1932, and should be an inspiration to every citizen to plant trees for its great master.

PLANT TREES FOR WASHINGTON

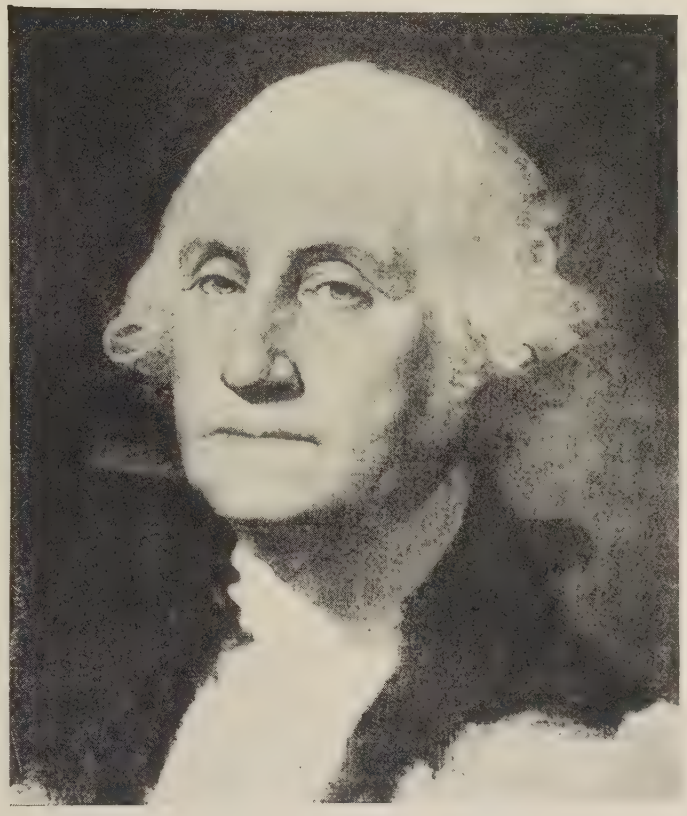
NATION TO CELEBRATE BI-CENTENNIAL OF HIS BIRTH IN UNUSUAL WAY

BY CHARLES LATHROP PACK

PRESIDENT, AMERICAN TREE ASSOCIATION

TEN MILLION monuments to a great man!

Ten million tributes, enduring and straight-growing, which will be as evergreen as is the memory of George Washington in the hearts of 130,000,000 people, recording the fact that he is ever the "first in the hearts of his countrymen." These are not to be monoliths of marble, not statues of static stone, or dun-colored copper and bronze, nor a eulogium written upon perishable parchment; but growing things, alive with a life emblematic of that living nation which the first President guided into being. The more significant will they be because the hands of thousands of citizens will have put them in this native soil. They are to be trees, dedicated to the "Father of Our Country." As the early pioneers who worked their lonely way across the far-flung plains to the West marked their homestead cabins with a grove of trees, so now the whole Nation, in the years of its prosperity, gathers to plant its trees—a memorial stretching across the face of the continent. It will mark the way that nation has come and will raise up its emblem of gratitude to the one who enunciated some of its leading first principles of government.



". . . . FIRST IN THE HEARTS OF HIS COUNTRYMEN"

Every citizen of the United States can honor the beloved Washington in no better way than to plant a tree to his memory

The whole population will thus have a part in the Bi-Centennial celebration of the birth of George Washington. It will become a second Continental Army, an army of tree-planters, made up of young and old mobilized in every state and hamlet, and actively engaged in setting up a lasting testimonial to the one whom this country delights to honor.

For the purpose of this remarkable celebration, Calvin Coolidge, when President, created the Bi-Centennial Commission. The American Tree Association of Washington, D. C., cooperating with this Commission, is directing this gigantic task of planting 10,000,000 trees, each one indicative of a Nation's honor to the National hero,—a particularly fitting way of remembering the life and services of the master of Mount Vernon. What more significant and unique method could be employed to manifest the affection which America feels for Washington? To be sure, he has not been without recognition in the past. The Federal City, the most beautiful in the land, bears his name, a great State on the Pacific also has registered its remembrance; there is no state in the Union without a Washington county, town or village, and squares and streets everywhere are named after him. His birthplace at Wakefield, Virginia, and his home at Mt. Vernon are among the shrines of the Nation and places of pilgrimage for many thousands every year. High over the Potomac, the graceful monolith of the Washington Monument, gleaming in the sunlight or glimmering in the moonlight, presides over the country's Capital.

Such tokens as these have been further enhanced from the Atlantic to the Pacific by the beautiful trees growing in the soil which Washington consecrated by his deeds. The beauty of the State of Washington lies largely in its snow-capped mountains, its far-stretching hillsides covered with the majestic Douglas fir, and its plains resplendent with yellow pine. The home of the Federal Government owes its main charm to the rows of tulip-trees, maples, elms and chestnuts which form leafy bowers for its streets, and through which the southern sun filters upon the whiteness of its graceful buildings. The Potomac along the Mall, in the early spring, reflects

"THE FEDERAL CITY"—NAMED FOR WASHINGTON FAIRCHILD AERIAL SURVEYS, INC.

Trees form the frame for its great beauty. The Bi-Centennial Commission hope for many such tree-filled cities after the tree-planting campaign has ended

the soft pink of hundreds of Japanese cherry trees in full bloom. Washington himself must have loved trees, for his diary contains repeated references to their value and care; and he chose a spot for his home where their beauty is unexcelled. Along the shaded path that leads to his final resting place, two columns of trim, straight larches stand like sentinels, his constant companions, along with those thousands of Americans who come to pay him reverence during the daylight hours. He must have loved the regal beauty of a tree.

In the symbolism of a tree can Washington be remembered preeminently. Deep-rooted in the ground, a tree is like a man, coming up out of the earth, but lifting its branches to heaven. And as it grows in usefulness, so it grows in beauty. It may outlast the ages, it offers its shade to all alike, and its disinterested ministries succour a thirsty countryside and provide for its physical and aesthetic necessities. So a tree bespeaks the spirit of Washington. He was democratic in his services, regal in his leadership, commanding in his principles, while he extended a brotherly hand to a new and independent people struggling for fuller freedom.

It was entirely natural, therefore, that the Bi-Centennial Commission, in seeking a way to permanently express the spirit and principles of the one whose birthday the whole country would signally remember, should decide upon a program of national tree-planting. Thus it is that the American Tree Association is sending out the call to every citizen, every civic and patriotic organization, every college and school, and every city and town, urging them, during the next year and a half, to plant trees which will be dedicated on the twenty-second of February, 1932. The records of these trees planted are to be sent to the American Tree Association, 1214 Sixteenth Street, N. W., Washington, D. C., and as they are received, special Bi-Centennial certificates will be issued for every planting.

Such a celebration will be one which is underlaid with reasonableness and true patriotism. Unlike our usual Fourth of July display of pyrotechnics and parades, this will definitely remind us of the meaning of Independence. Whereas customarily only a few take an indifferent part, this project will engage the heart and hand of every citizen. He becomes a planter in the soil that George Washington helped to make free. He will become a brother-patriot indeed, along with his neighbor, in reflecting upon the greatness of the man and the wisdom of his government. For with his own hands he will erect a tree —such a thing as Washington himself loved to do. Planted along highways, or in state or town forests, or on lawns, these trees will represent the greatest esteem ever paid to a national hero.

Not only will this part of the celebration involve an act of commemoration, but it will supremely carry out one of the guiding principles of George Washington, namely, that of self-sufficiency in national government. This means conservation. A nation must be strong and able to take care of itself in emergencies. Thus only can entangling alliances become unnecessary. There is no greater need in the United States today, in the matter of

PLANTING A SCION OF THE WASHINGTON ELM

Mrs. James H. Dorsey of Baltimore, Md., contributes a grandchild of the famous tree under which Washington took command of the Continental Army at Cambridge, Massachusetts. The infant is planted under the auspices of the National Press Club Post of the American Legion, and dedicated to the memory of the First Chief on the front lawn of the American Tree Association building. Left to right: H. E. Radcliffe, P. F. Hannah, Russell T. Edwards, Frank A. Hall, Mrs. John D. Sherman, Mrs. R. Bruce Horsfall, Thomas Harvey Gill, Mrs. Dorsey and Soterios Nicholson

self-strengthening, than that of trees. Washington would undoubtedly be the first to desire, as memorials to him, trees that will make his country a stronger and better one. There are 81,000,000 idle acres now existing in the United States which are suitable for forests only. The crop of timber steadily dwindles, while the rate of consumption is on the increase. There have been times when men and guns and bullets were the supreme necessity. That is not so now, for the national necessity is trees and more trees. It is one thing to subscribe to the principles of Washington; it is another thing to put them into everyday practice. Strength acquired from a constantly diminishing resource is not true strength, nor true patriotism, but short-sightedness. The main source must be replenished—and that immediately and regularly. Consequently there is at this particular time an economic as well as symbolical reason for the planting of trees in honor of George Washington and each reason is alone sufficient to bring action.

Already this program is being carried out through the land. Already trees are being planted in the name of George Washington, trees that will be dedicated on the two hundredth anniversary of his birth, February 22, 1932. In beginning the first George Washington memorial in Denver, Colorado, last June, the General Federation of Women's Clubs set seedlings in the ground there. Mrs. John F. Sippel, President of the Federation, and Mrs. Katherine Tippetts, Chairman of the Committee on Conservation and Natural Resources, were the chief participants in the ceremony. This act will be duplicated by most of the 14,000 Women's Clubs of the country.

The Garden Club of America is being asked to cooperate with the American Tree Association and the Bi-Centennial Commission in Memorial Tree Planting by Mrs. Charles L. McNary, wife of Senator McNary of Oregon

THE UNITED STATES COMMISSION FOR THE CELEBRATION OF THE TWO HUNDREDTH ANNIVERSARY OF THE BIRTH OF GEORGE WASHINGTON

Chairman

The President of the United States

Vice Chairman

Simeon D. Fess.....Ohio

Vice President of the United States
Speaker of the House of Representatives

Senatorial Commissioners

Arthur Capper, Kansas; Carter Glass, Virginia;
Lee S. Overman, North Carolina

Representative Commissioners

Willis C. Hawley, Oregon; John Q. Tilson, Connecticut;
Joseph W. Byrns, Tennessee; R. Walton Moore, Virginia

Presidential Commissioners

Mrs. John Dickinson Sherman, Colorado; Mrs. Anthony Wayne Cook, Pennsylvania; Henry Ford, Michigan; George K. Eastman, New York; C. Bascom Slemp, Virginia; Wallace McCamant, Oregon; Albert Bushnell Hart, Massachusetts; Bernard M. Baruch, New York

Executive Committee

The Senate Commissioners, The House Commissioners, C. Bascom Slemp, Mrs. Anthony Wayne Cook, Bernard M. Baruch

Associate Directors

Lieut. Col. U. S. Grant, 3rd., Representative Sol Bloom

Historian

Prof. Albert Bushnell Hart

at the Seattle Convention of the organization; and Mrs. Frank B. Noyes of the Washington, D. C., club will gain the support of the Capital City group. Local units of the Garden Club of America, in every corner of the United States, are to take part in the nation-wide tree-planting.

Particularly fitting is it that the Daughters of the American Revolution, the Sons of the Revolution, the Children of the Revolution, Colonial War Societies, together with other leading patriotic organizations in the country, have promised their support to the tree-planting drive. These direct descendants of the men and women who knew Washington, who fought for him and with him established a great nation, should have a lion's share in commemorating his achievements. Fitting, too, it is that the American Legion is proposing to create memorial and town forests inscribed to the first Commander-in-Chief. Civic and fraternal organizations—Chambers of Commerce, Rotary Clubs, Kiwanis Clubs, Lions, Elks, and Masons—will join the army of planters, to enshrine still more deeply the national hero in the national heart.

The 23,000,000 school children of the United States will probably form the backbone of this second Continental army. Through their reading and study of history they are probably as near in spirit to the first Chief as many of their parents. The lesson of patriotism to be taught by tree-planting will be most timely, to instill them with patriotic ideals and understanding of the Washingtonian principles during the most formative period of their lives. Each pupil in each school can plant a George Washington tree; or better still, the entire school may plant some vacant acreage to a school forest that not only will be a source of revenue, but a laboratory to create forestry-minded citizens.

Not only the schools, but the organizations of the Country's future voters, Boy Scouts, Camp Fire Girls, Girl Scouts, Hi-Y Clubs, Girl Reserves—will swell the total of tree memorials toward the ten million quota set by the American Tree Association. The Camp Fire Girls have already swung their forces into line. Through C. Frances Loomis at National headquarters, the message —"Plant for George Washington"—has gone out to 9,000 leaders in every state, and Camp Fires have already begun to plant.

Many thousands of individuals are to participate "on their own" in the Bi-Centennial. The first individual tree was put in the ground on June 18 by E. H. Wiehe of Forest Hills, Long Island, New York. Mr. Wiehe's example will be followed in every section of the land, whether the space for trees be large or small.

George Washington wanted not only a strong nation,

(Continued on page 196)

TEN DIRECTIONS FOR TREE PLANTING

1. Secure stock from reputable nurseries. Seventy-five percent of the trees taken in the native state from woodlands die. Trees up to twelve feet in height are best for highway and shade tree planting. Your nurseryman will give full particulars.

2. Plant at the right time. For deciduous trees this is: East generally, spring and fall; south of the line formed by St. Louis, Chicago, Buffalo and Boston, during the tree's dormant period; north of this line, spring; middle west, spring; Pacific slope, as early in the rainy season as dormant plants are available. Evergreens: East, three months before and after the usual time at which the ground freezes, or in the spring; West of the Missouri River, spring; Pacific coast, during the early rainy season.

3. Keep the roots in a cool place and covered with wet burlap until time for planting.

4. Space trees at the following distances: lawn trees, twenty-five feet; street trees, thirty to eighty feet; trees for windbreaks, six to eight feet; forest trees, six by six feet apart each way.

5. Trim off broken or bruised roots before planting, and trim back side branches. Dig the hole large enough so that the roots may be spread out naturally, and deep enough to allow twelve inches of top soil to be placed under them when the tree is placed at the same depth it was at the nursery (this is easily determined by the dirt ring on the trunk).

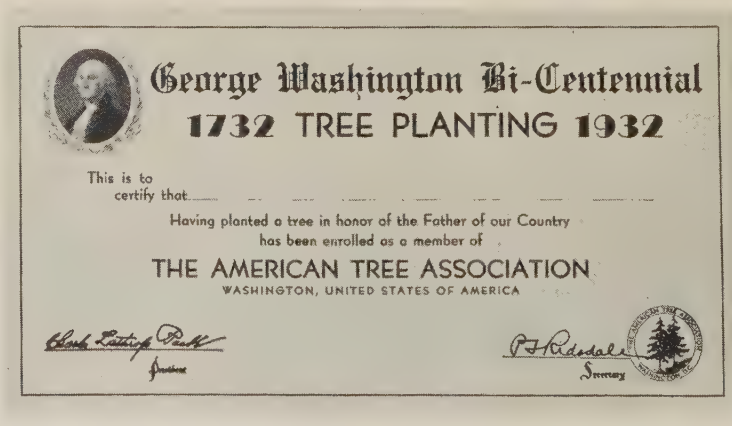
6. Use liberally good fertile top-soil. Fill in around the tree, pressing earth down firmly, and embedding all parts of the roots and working the soil under the root crown. Use tamping stick with large trees so that the dirt will be in contact with the rootlets.

7. Pour in water to the top of the hole after filling three-quarters full. After it has settled, completely fill in, leaving top-soil loose. Do not hill up. Water frequently for some time after planting, and water regularly in arid regions.

8. Trim small branches and limbs back to next larger stem, also broken or bruised branches. Touch up stumps with paint. Do not cut back central stem, especially on hardwoods. Stake large trees, and prevent chafing by wrapping with burlap.

9. Leave cultivated area three to five feet in diameter around the tree. Cultivate and mulch breaking up top-soil during first year or two. Dig up the soil to depth of two or three inches around base of tree. Excellent mulches, which keep in the moisture the tree needs, are: leaves, straw, litter, well-rotted manure and compost. Deciduous trees should be pruned annually during summer, the amount to be determined by the shape of the tree desired.

10. Consult your city or State forester, or the tree expert of your nursery for information on types of soil best suited to different trees, best locations, and proper species for each purpose. Write the American Tree Association, 1214 16th Street Northwest, Washington, D. C. for advice. And above all, plant.


George Washington Bi-Centennial
1732 TREE PLANTING 1932

This is to certify that

Having planted a tree in honor of the Father of our Country has been enrolled as a member of

THE AMERICAN TREE ASSOCIATION
WASHINGTON, UNITED STATES OF AMERICA

THE BI-CENTENNIAL TREE-PLANTING CERTIFICATE

Of attractive buff and blue, the Bi-Centennial colors, the certificate signifies that a tree has been planted for Washington, and is a membership card for the American Tree Association. A permanent record of every tree set in the ground will be kept. Several hundred certificates have already been issued

LOOKING AT SAN FRANCISCO'S MARKET STREET FROM TWIN PEAKS

In the pictures, from left to right, you are looking with the naked eye and with six-, eight- and ten-power binoculars

WHAT'S INSIDE A BINOCULAR?

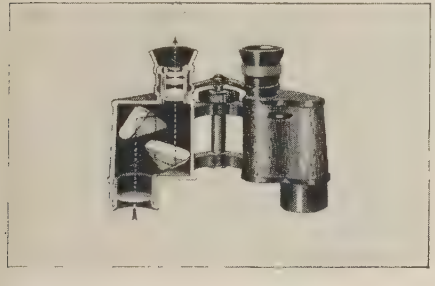
HOW TO CHOOSE THE GLASS FOR YOUR FIELD STUDY

BY ED WOLFF

PHOTOGRAPHS COURTESY BAUSCH AND LOMB

"BINOCULARS," remarked an optical authority recently, "represent a phase in the efforts of man to push back the boundaries of distance." We admire the pat aptness of the description, yet how many of us who raise a pair of field glasses to our eyes know their inner secrets?

Efforts to extend vision date back to 1608 when the first telescope was produced. Galileo devised a telescope to use for his astronomical work in 1609, and the simple type of instrument still bears his name. That was a single tube, to be used with one eye only. Single-tube glasses of pocket size are still made today; they are called, quite naturally, monoculars—one-eye glasses.



PRISM BINOCULAR

Showing the path of light to the eye

We have received many requests from our readers for advice on the selection of binoculars for bird study and other Nature field work, as well as for general use. To be of still greater help we asked Mr. Wolff to prepare this simple article on the binocular. If anyone would care for a booklet describing simply, yet scientifically, how to test binoculars just drop a note to the Editor for it

By 1823 there were in use sets of double telescopes—two parallel tubes mounted in one frame, so spaced that each eye had a tube for itself. Anyone who remembers enough of his Greek to recall that bi-cycle means double-wheeled will know why these glasses are called bi (n) oculars—they are two-eyed instruments.

In essential structure these first binoculars were simple Galilean telescopes. They still survive in the familiar opera glass. In the better grades they are quite satisfactory if the distance to be bridged is not great and if the objects to be observed are large—bear, deer or moose, for example.

But the Galilean glass has a number of disadvantages for greater distance or when the far-away objects are small. One of these draw-backs is due to the straight tube. If you will now close one eye and observe several different far-away objects you will find it difficult to judge their respective distances from you and from each other. Yet when you look with two eyes the relative positions become apparent. The reason for this is that in using two eyes you see the objects from two slightly different angles. This is called the stereoscopic effect. The greater the angles, the greater the stereoscopic effect.

GALILEAN FIELD GLASS

The principle in the old opera glass

So the prism binocular was invented. The eye-pieces, of necessity, are as close together as your pupils when you look through them, the adjustment being simple because the two halves of the instrument are connected by a hinge.

But the object lenses (those through which the light enters) are farther apart than your own eyes. Hence the stereoscopic effect, even at great distances, is quite natural

and satisfying. In order to bring the light from the far-apart object lenses in line with the close-together eye-pieces, glass prisms are employed.

These prisms are triangular. They are used because of the peculiar fact that light striking a surface of glass at a 45-degree angle will not pass through. It will be reflected exactly as it is reflected from a mirror. In the drawing on page 179, the dotted line shows how the light entering the object lens is turned at right angles to its course every time it strikes the 45-degree surface of a prism.

After you have looked at a distant object through a prism binocular and then look at it through a Galilean glass, the latter will make it seem quite flat—something like the difference between looking at a ball and looking at a circle of the same diameter.

Of course you want your glasses to magnify, and here enters a difficulty. It is pretty safe to say that your eyes are not exactly equal in their seeing power. The difference is negligible in ordinary vision, but as you magnify the view through your binocular you magnify the defect in your vision as well. To compensate for this, most prism binoculars have a separate adjustment on one eye-piece, usually the right. You focus the entire glass to suit the vision of your left eye, then make the necessary correction on the eye-piece for your right eye.

Now, as to magnification—or "power," as it is usually called. A man at a certain distance from you appears to be, let us say, three inches high to the naked eye. If your glass is a 2-power, it will double his apparent height—he seems six inches high. A 4-power glass will increase his apparent height four times—to 12 inches in this case. Through a 6-power glass he will seem to be six times three inches high—a foot and a half. And a 10-power binocular will make him appear thirty inches tall. To put it another way, the power is the number of times that the glass magnifies the object.

Given your choice between two binoculars, alike in every respect except that one is a 6-power and one is 10-power, which would you take? The 10-power, very likely—and very likely you'd be wrong to choose it. A 10-power is too strong for the average man. Not for his eyes, but for his hands. He can't hold the glass steady enough. And, as every tiny movement of, say, one-tenth of an inch is magnified to an inch, the object he's looking at appears to dance and bob around in most annoying fashion. The advisable binocular for most people is a 6-power, though many find an 8-power to their liking. If you can use a 10-power and see a steady field of view you have most enviable nerves.

The field of view—that is, what you see through your glass—depends largely upon the diameter of the object lens. You do better, as a rule (and with some exceptions), to choose a 6-power glass with a large object lens than an 8-power with a small object lens. You'll see more at one time—and six magnifications give a surprisingly large increase in apparent size. But, remember, the higher the power the smaller is the field of view. And in the Galilean glass the field of view is much smaller than in the prism type, even when the powers are rated the same.

GALILEAN FIELD OF VIEW
What you see when looking through the old type glass

AND WITH A PRISM BINOCULAR
The same object is visible in this broader field of view

A really good binocular will show a clear field to the very edge, while in a poorer glass the farther you get from the center the more hazy and blurred the object is likely to appear. In a poor glass, also, you may expect distortion—the edge of a tall building will seem to bulge. A good glass, besides, shows no color aberration. If you want to know what color aberration is, look through a poor glass at a brightly lighted object. It will seem to be edged with rainbows that dazzle and obscure the vision.

Here's a good test to remember when you're buying a binocular. Draw on a piece of paper two lines about two feet long, crossing each other at approximately right angles. Rest the glass on a support about one hundred feet away and look at the cross. If you see only one cross, the optical and mechanical axes of the lenses are in alignment. If they aren't, you'll probably see two crosses. The alignment of a binocular may be correct when the glass is new, but very little wear or the slightest impact may throw it out of adjustment, unless it is rigidly constructed to give many years of service.

The difference in the price of binoculars is due principally to the cost of the human labor involved. As between the very best grades of optical glass and a mediocre quality the difference in cost for the small quantities of actual glass employed is not much. But to refine each lens and prism to an accuracy of a small fraction of one light

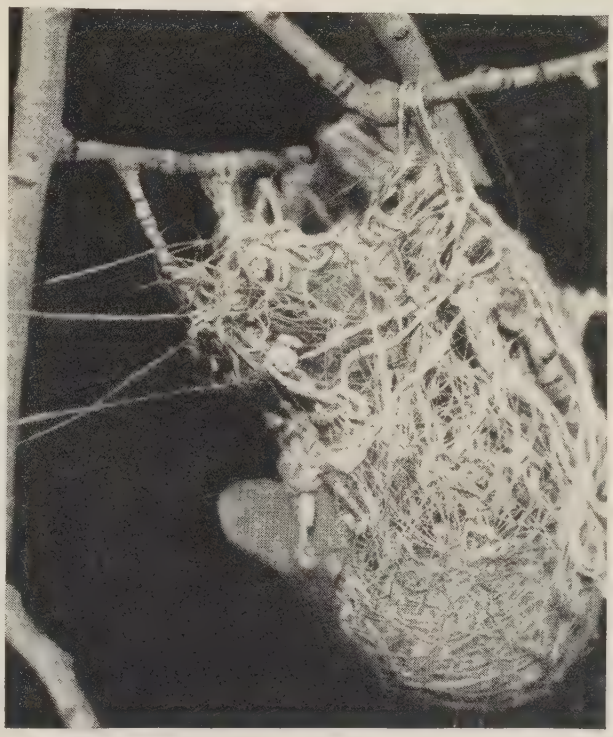
wave demands time and a high order of trained skill.

Then, too, upon the mechanical structure of the binocular depends its accuracy and durability. The tubes should slide upon each other freely, yet it is desirable that they be impervious to even the finest dust. Again, with the popular qualities of light weight and compactness, it is well to secure a rigidity which will insure that after years of use (and perhaps abuse) the various lenses and prisms will remain in their original optical alignment. Otherwise distortion, aberration and other imperfections are likely to become more and more manifest.

In binoculars, as with other merchandise, the buyer dealing with a reliable house gets just about what he pays for. When, accurate work is needed, the best alone is good.

THE BALTIMORE ORIOLE'S NEST

BY C. L. MELLER



A MASTERPIECE OF NEST BUILDING

Though not as intricate as it seems, it has all the strength that scientific engineering would require

A MASTERPIECE

It is no exaggeration to say that the nest of a Baltimore oriole is an exquisite piece of craftsmanship. Swinging from the topmost branches of some tall tree where it is skilfully hidden among the foliage, the nest reveals itself only after the leaves have fallen. Even then the unaided eye can see little more than the outline. It is small wonder, therefore, that few people even among bird lovers know what an oriole's nest actually resembles.

Nest building is instinctive with birds, yet building in the manner of an oriole gives evidence of an intelligence that somehow transcends instinct. Though it requires diligent search, proper nesting material is to be found practically everywhere in town and country. The average nest reveals that the horse is most employed, with store string a large constituent, although in much smaller quantity. Such material as sewing thread, mercerized cotton and even silk thread, of which a very little is used, must be regarded as incidental, something that came to hand in the course of construction. In the lining of the nest we find felted wool, made of bits of raw wool evidently picked up in some pasture or farm yard and felted together in the manner of the manufactured article, though more crudely.

Careful study proves the nest to be not nearly as intricate as at first it would appear, though let us not on this account begrudge the little songsters the praises due them as engineers of no mean ability. The nest easily carries its full capacity of wet sand, which, it must be observed, affords a wide margin of safety over the actual weight of mother and fledgelings. The top where the nest stretches from twig to twig will withstand a pull of twelve pounds. Whatever pattern the weave suggests is casual and entirely due to the nature of the material employed.

The manner in which string is utilized suggests strongly that the bird has some comprehension of its character. Contrary to what might be expected string is not used in taut straight lines, but is allowed to fall loosely into those loops and twists so typical of this material. Through these self-formed loops the bird passes other string, thread or horse hair and thus achieves an irregular weave. From the very nature of the process the weave is well matted and hard to pull apart. Small loops and short ends of string are allowed to hang loosely against the outside of the nest in quite a haphazard though none the less decorative manner. Unravelling the string in an oriole's nest is a puzzling job since its method of building permits the bird to use string in whatever form it finds it—in straight pieces almost a yard long, in short and very much knotted pieces and in pieces still tied in a loop as they left the store keeper's hands. Used at and near the top of the nest this string serves the purpose of cables with which to attach the nest to its supporting twigs and onto which in its turn the horse-hair bottom is attached. Any one who has ever noted the ease with which an oriole can puncture a pea pod and extract the peas therefrom will readily understand that thrusting a horse hair through the knot or twist of a string becames a simple matter for this bird. Of its own accord the bird ties no knots and none of the horse hair is ever looped back upon itself. The fact that all the material employed is light in color indicates that the birds spy their nesting material from a considerable distance, and go and get it some ways from home.

A CASE OF YELLOWS
The bunchy upright growth of the plant is characteristic of this blight

ASTER'S ENEMIES

HOW TO SAVE YOUR PLANTS

BY C. T. GREGORY
PURDUE UNIVERSITY AGRICULTURAL EXTENSION DEPARTMENT

THERE is no flower with a greater variety of color or which carries its profusion of blooms over a longer period than our old china aster. This flower has won its way into our hearts and deserves a prominent place in every garden. This is what many others think but so often these aster lovers have given up this flower in disgust. They feel that they cannot grow it successfully. In spite of their loving care and attention the plants die each year. Asters have disappeared from many gardens.

Probably one of the worst diseases of asters is wilt. The fungus *Fusarium conglutinans* var. *callistephi* is capable of living in the soil for several years, ready to attack the aster as soon as it is planted. The affected plants die quickly and turn black, root and all. In the early stages of the disease the leaves turn dark brown on one side. Dark brown streaks appear in the stem, often extending from the roots to the diseased leaves.

There is no way out except to pull up the wilted plant and destroy it. The control of this disease is threefold. First, if possible, select seed from healthy plants because the fungus can get into the seed, but seed from healthy plants cannot possibly carry the germ. Next, people growing aster plants should be certain that their soil is not infested and the only way to do this is either to disinfect the old soil, or to use new soil that has never grown asters.

Soil disinfection can be accomplished in one of two ways—by steam or by formaldehyde. Perforated pipes sunk about eighteen inches apart and a foot deep in the loosened soil will carry the steam throughout the bed. The steam should be under pressure of at least forty pounds and preferably at one hundred pounds. Heat the soil in this way for at least three hours.

Formaldehyde disinfection will serve either for the plant bed or to cure the disease in the aster bed in the garden. First loosen the soil thoroughly by spading and cultivating it. Then dilute the formaldehyde, one pint in twenty-five gallons of water, and apply this solution at the rate of one gallon per square foot. Cover the bed with canvas or with straw to hold in the fumes for at least two or three days. Remove the cover and permit the soil to dry out sufficiently so it can be again loosened

THE EFFECTS OF WILT
Dark areas appear on the leaves (inset), then the plant withers. The last stage is shown at the right

YELLOWS-INFECTED BLOOMS
Compare with the healthy blossom at the extreme right. Below, the dark streaks indicate aster wilt

up. After aerating for a week it will be safe to plant the bed.

Sometimes the asters turn yellowish and seem to stand still in their growth. Such symptoms have been mistaken for those of the wilt but when the plants are pulled up, bluish colored lice are found abundantly on the roots. Under such conditions it is possible to save the plants by pouring a cupful of nicotine sulphate solution into a depression in the soil about the base of the plant. Ants carry the lice to the roots hence cultivation of the soil to demoralize the ant colonies will help to reduce the spread of these lice.

One of the most peculiar diseases of aster and one that ranks with the wilt in its destructiveness is the yellows. The diseased plants are stunted and the leaves are yellow. The flowers may be entirely suppressed or, if produced, are usually dwarfed on one side. The dwarfed side is green.

Yellows belongs to a great group of diseases known as mosaics. The infectious principle is carried in the sap but no one has ever seen what it looks like. If it is a bacterium, as many believe to be true, the bacteria are too small to be seen under the highest magnifications now possible. We do know, however, that the sap of diseased plants can be spread by one of the leaf hoppers. We know, too, that there are about fifty different kinds of plants, including many common perennial weeds, that will carry disease year after year.

In the past the only hope we could offer for the control of this yellows disease was to destroy any infected aster plant as soon as it shows the disease. Furthermore, all weeds about the aster beds should be carefully destroyed to get rid of this source of trouble.

Recent investigations have shown that plants sprayed with bordeaux mixture will absorb into their sap small amounts of copper from the spray. This copper solution in the sap is deadly poisonous to leaf hoppers. This holds out a new means of attacking yellows. Spray the aster plants with a 4-6-50 bordeaux mixture or dust them with a 25-75 copper lime dust. Begin this when the plants are young so that the sap may be impregnated with the copper early in its life.

There are three leaf spots of aster that may become serious though ordinarily they are not. This spraying with bordeaux will take care of these spots quite satisfactorily.

Strange as it may seem, asters planted near pine trees may become infested with a rust disease. The leaves of such plants are literally covered with small orange colored pustules which cause the leaves to turn yellow and die. One stage of this rust occurs on the pine whence it spreads to the aster.

There is a black shiny beetle known as the aster beetle that eats voraciously of all kinds of flowers. Ordinarily one of the arsenical poisons will kill such leaf-eating or flower-eating insects, but this one seems to be immune to such poison. The way to get rid of this pest is to dust with sodium fluosilicate. Apply it when the bugs are present and when the plants are dry because wet plants will be injured.

Where there is a will, there usually is a way—and by good care and scientific cultivation, asters can be grown year after year despite their many and vicious foes.

WHITE HILLS IN THE HEAVENS FRAME THE BEAUTIES OF EARTH

THE HILLS OF FAIRYLAND

ETERNALLY CHANGING, EVER-RESTLESS, ALWAYS NEW

BY M. LUCKIESH

PHOTOGRAPHS BY THE AUTHOR

It's up where the blue begins—the land of Fairy Hills. Or sometimes it descends to just above the tree-tops, as if to take possession of the realms of earth. Often it disappears entirely to leave the vault of the sky empty of its treasures—disappears like human dreams caught in the web of reality. But always it returns.

An eternally restless land—this. Now it billows wildly, heaping peak upon peak until the top, sharp-etched against the firmament, seems almost to touch the sun. Now it becomes a flat gray plain along the horizon, as drab as dunes in winter. Then men say: "Expect rain tomorrow," and hasten to bring in their hay, or to complete the outside chores that must be done.

It's never twice the same. Now grotesque heads form out of the fleecy white. "See," children murmur as they watch them: "There's a mother with her baby. And in the north, a camel walks the sky." But only for a moment. Valleys lift to build steep slopes, a hill tumbles, and the forms are gone.

Best about this land are its colors. Dawn is the first painter, and his brush is a lavish one, dripping with saffron and pink and gold. Each moment he strives for new effects; each moment the color scheme changes, until, discouraged at ever achieving scenes to his liking, he leaves the hills to Day. Then come the fleecy whites, as pure as newly cleaned cotton, and the fairyland above

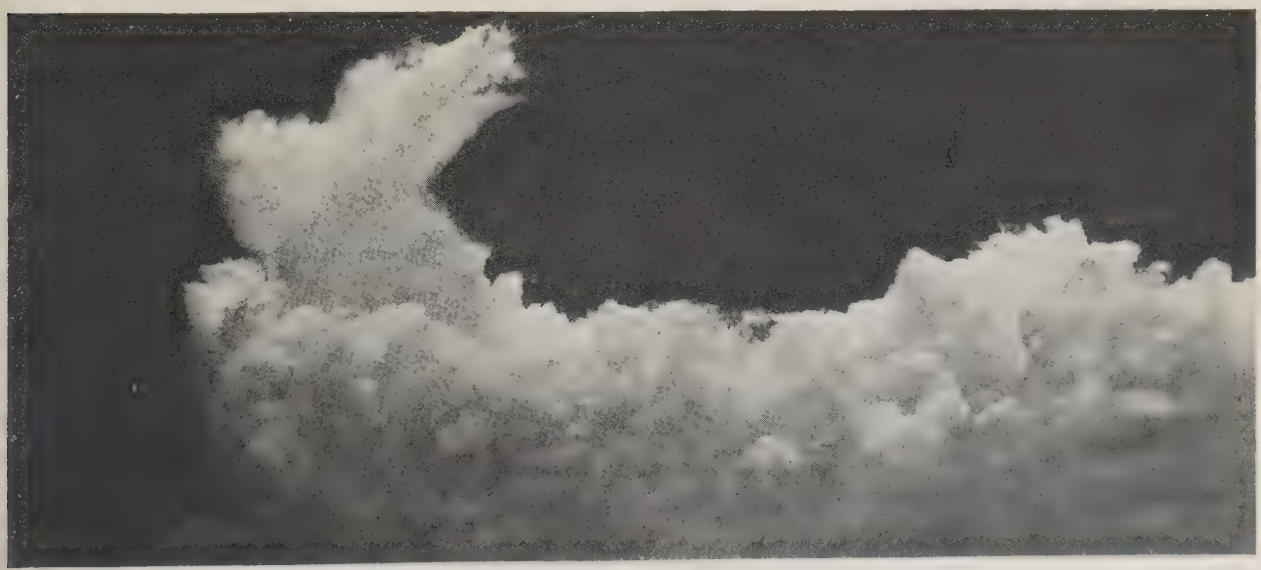
. . . AND TIERS OF MOUNTAINS, LIKE GREAT BUBBLES, FLEETING LIKE DREAMS

shines like the alabaster cities of old Biblical tales.

Noon brings clear darker shades,—gray thunder-ledges, as sombre as an Ibsen play, that reach up and turn out the sun; black rolling foothills; yellow-touched plains stretching fan-shaped across the sky. Then are born the gauzy, fairy-cliffs of rain, straight-dropping to the base of earthly hills.

Sunset, however, is the master painter in this fairyland. When the mists are over and the grays retire, then comes his artistry. He touches the edge of the hills with a line of gold, and bathes their slopes with a ruby red. Each fairy range, each tier of hills, blazes and burns like forest fires on earth. Each island, slowly drifting on the blue, becomes a blot of flame.

The palette is soon emptied, however, and Night takes a hand. The mountains become darker smudges against the stars. Finally the moon, a worker in silver, appears and once more the forms of fairyland come into view, bathed in a chaste light. Now they are most beautiful of all, for moonlight was made for fairy things.



SOMETIMES THERE ARE GROTESQUE FORMS, THAT QUICKLY FADE AWAY. . . .

PSEUDO-FOSSILS FOOL THE INEXPERT

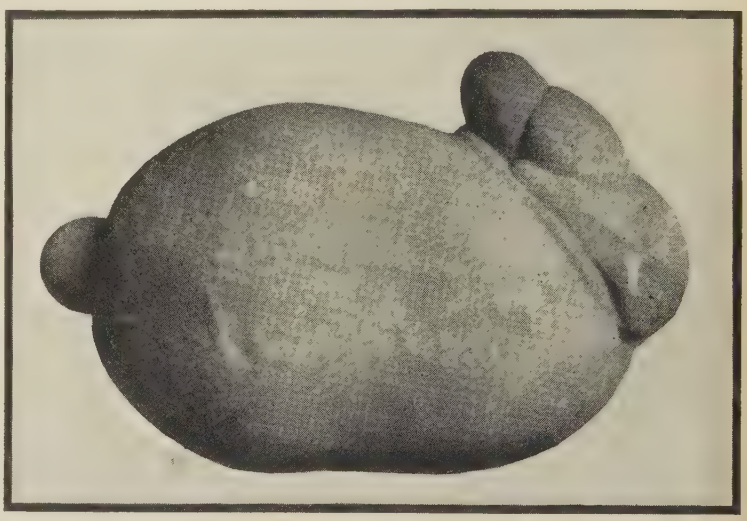
THEY APPEAR TO BE WHAT THEY ARE NOT

BY CHARLES W. GILMORE
U. S. NATIONAL MUSEUM

WE HAVE all, at various times, heard of springs or other waters which "turn things into stone," and while this is not actually the case, there are waters so fully charged with carbonate of lime that immersed objects soon become incrusted with a stony covering. This is especially true of certain hot waters, like the Mammoth Hot Springs in the Yellowstone National Park, or the Thermopolis Hot Springs in Wyoming. Those unacquainted with this phenomenon are often misled into believing such objects to be petrifactions.

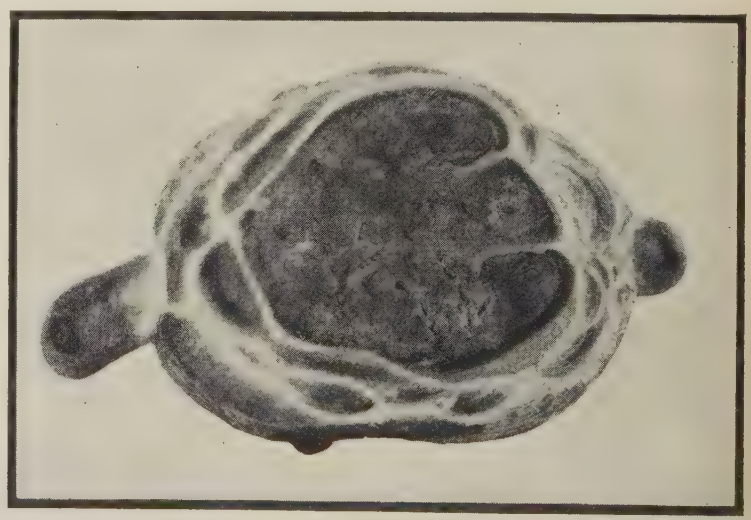
Petrifaction, however, is a quite different process and takes place only under certain favorable conditions. First of all, the object must be sufficiently firm or resistant to retain its shape, and thus it is that only the hard parts such as shells of invertebrate, and bones and teeth of vertebrate animals are so preserved. Petrifaction, in fact, is but the replacement by mineral matter, wholly or in part, of the original organic substance. This commonly comes about by the infiltration of water carrying in solution minerals, usually lime or silica, which, as the organic matter is dissolved or leached out, are deposited in its place. So gradual and complete is this process that the most delicate cellular structures as well as the general form of an object is preserved.

To all outward appearances the petrified object, whether it be wood, shell, or bone, differs from the original only in its greater weight, increased hardness, and change in coloration. When fully petrified such objects are as heavy and enduring as stone itself. It should now be obvious that flesh would entirely disappear long before such a process could be perfected and thus it is that "petrified bodies" cannot exist, despite the numerous reports of such occurrence.



THE SLEEPING RABBIT

It might be a statue of a "bunny", but is only a sandstone concretion



LIKE A TURTLE SHELL

But this clay concretion found near Lake Superior is but a good imitation

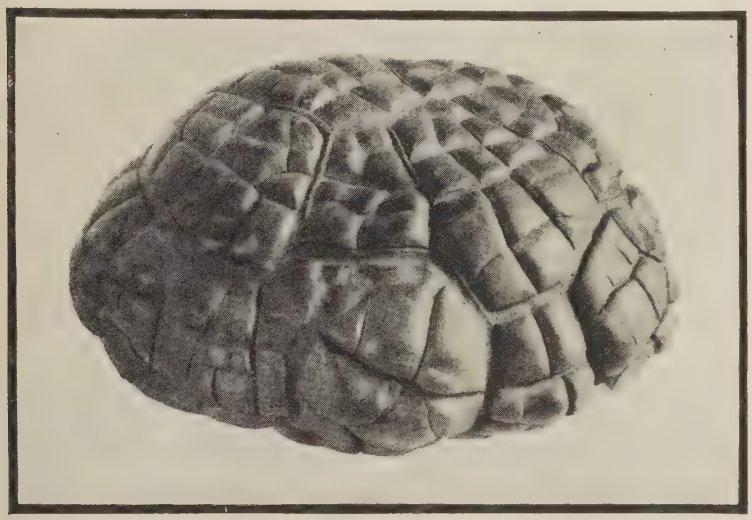
Occasionally animal forms and faces are represented in the outlines of rocks, but these are usually the fortuitous results of weathering. Most deceptive of all, however, are those stony objects known to the geologist as concretions which often simulate the forms of animals and other familiar objects. With these, however, they have no relationship. So close are the general resemblances that individuals not conversant with the existence of such objects are misled into thinking they are fossil turtles, snakes, reptile heads, parts of the human body, and what not.

A few characteristic examples of these imitative forms are shown in the accompanying illustrations made from specimens now in the geological collections of the U. S. National Museum. All of these are of inorganic origin and never had any connection with the objects they appear to represent.

Petrified snakes are perhaps more often reported than anything else, and a particularly good example is illustrated here. Its origin is explained by the late Dr. George P. Merrill as "a peculiar result of wave or ripple work in soft mud influenced by some aquatic vegetation." This

extraordinary specimen was found near Chillicothe, Ohio.

Plants, vegetables and fruits are frequently imitated. I once collected a "pumpkin", so called, in the Painted Desert in northern Arizona some years ago. It is as large as a good-sized pumpkin, the texture of the surface is slightly suggestive of the roughened surface of a real pumpkin, and even the stem is present. This curious structure was embedded in a soft sandstone which, upon erosion, released the more resistant concretions. The locality in which it was found has a wide, local recognition as the "petrified pumpkin patch." More than an acre of ground is covered by these objects in all sizes.



COMPLETE TO MARKINGS

But this West Virginia find has no connection at all with a turtle

A PETRIFIED SNAKE?

No, just a ripple mark made in soft mud. Such a find is often reported

These concretionary structures are formed with or without the aid of some central body as a nucleus—a shell, stick or stone—around which the particles are deposited ofttimes in concentric layers. In this way concretions of sandstone, limestone, silica, clay, and clay ironstone are formed. The clay ironstone mentioned sometimes cracks into polygonal masses and when the cracks become filled with calcite it is known as a septarian nodule or fossil septarian. Formations of this type are often mistaken for fossil turtle shells. A particularly fine example from West Virginia and a second specimen (clay concretion) of different origin, from the shore of Lake Superior, are shown herewith.

There is no limit to the objects which concretions may simulate, a vivid imagination being the only necessary adjunct. Many years ago a professor of geology in Wyoming University received from a correspondent a concretion having the shape of a boot sole that by its finder was purported to be the "petrified sole of Captain Bonneville's boot," so designated because it was found in the vicinity of a spring where Bonneville was said to have had his camp. The discoverer of this unique specimen was further convinced of its genuineness because of the presence along the edge of certain markings which he interpreted as being made by the thread sewing the sole.

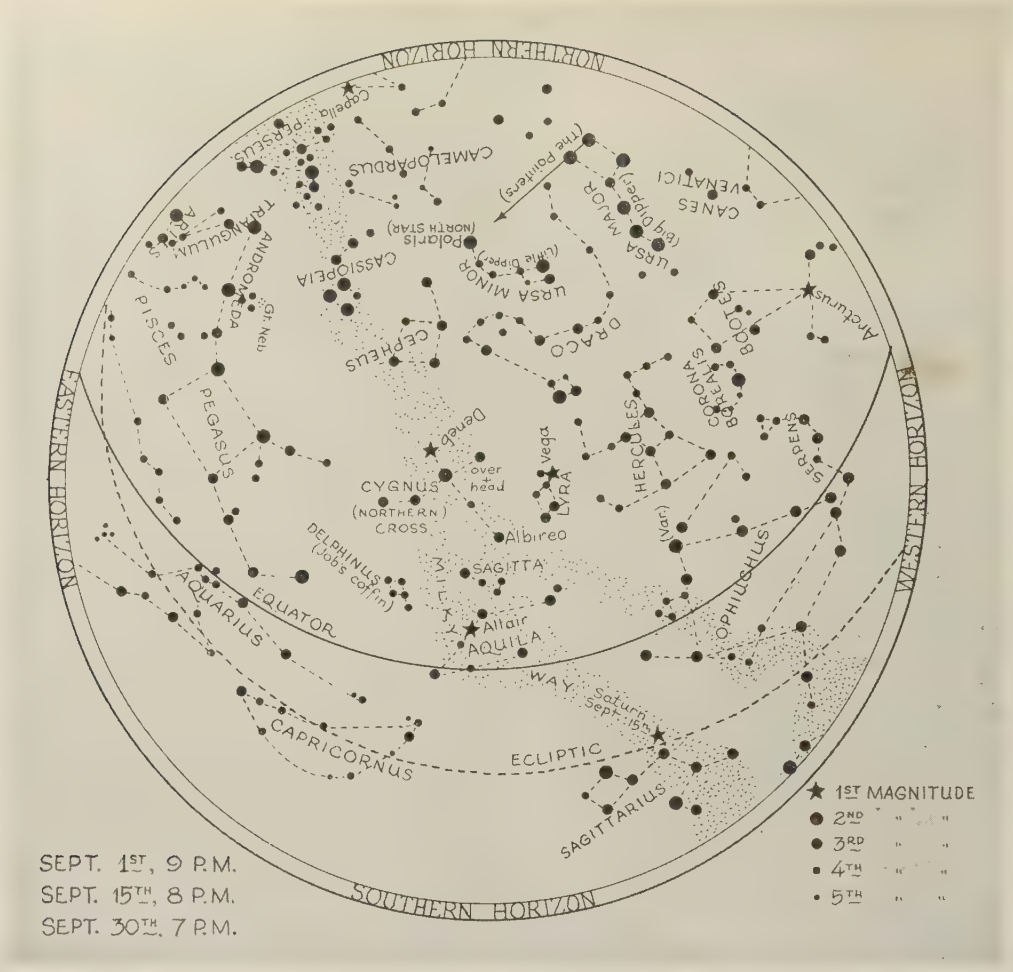
While collecting fossils in Wyoming a ranchman visited our camp and after seeing and discussing the fossil bones we had acquired announced that at his ranch, some twenty miles distant, he had the largest petrified bedbug that had ever been found. I was invited to inspect it. It should now be unnecessary to say that it was simply another concretionary form that had taken on the segmentated shape of a bug.

A concretion simulating the head of a reptile—or duck, all depending upon the turn of the imagination—is fairly common, and one National Museum specimen proves how deluding it can be. The supposed eye is probably the end of the nucleus around which the mass formed. This particular specimen was found in Panama while digging the Canal.

Another interesting sandstone concretion is the sleeping rabbit.

Of all the known kinds of concretionary forms, none perhaps is more common than those of sandstone origin, spherical in shape, and which in certain localities occur in great abundance. When deposits in which such concretions occur are exposed by railway cuttings or by the natural erosion of streams, "cannon ball cut" has come to be the usual local appelation, and there are many of these in our western mountain country. So common is this particular type of concretion in certain formations in North and South Dakota that the stream bisecting the area has been designated as the Cannon Ball River.

Even in Nature all things are not what they seem. And sometimes the geologist or paleontologist himself is fooled, but he is not caught often, as is the untrained individual who finds a queer formation and believes that some great evolutionary discovery has been made. Pseudo fossils complicate matters for the scientist—he often has to stop to prove to some enthusiastic finder that not all objects with the shapes of birds or animals once had life.



To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south

IN SEPTEMBER SKIES

BY ISABEL M. LEWIS

DIRECTLY overhead about nine o'clock on the evening of the first of September lies the constellation of Cygnus, The Swan. The principal stars in Cygnus form the Northern Cross. Deneb Cygni, or Arided, is one of the twenty brightest stars. It is also one of the super-giants of the heavens. If Deneb were at the same distance from the earth as the brilliant Vega, which may be seen near the zenith at this time, it would appear more brilliant and beautiful than the planet Venus. Deneb is so distant, however, that its light takes more than six and a half centuries to reach us and its great distance makes it inferior in brightness to such stars as Sirius, Arcturus, Altair, and Vega, all of which are comparatively close—yet hardly crowding—stellar neighbors of ours.

Albireo, which lies in the head of The Swan, is probably the finest double star in the heavens. The smallest telescopes will show the two beautifully contrasting stars of which it is composed—one a deep yellow, the other a brilliant blue.

Cygnus lies in a very interesting region of the Milky Way. Here are great nebulae that extend to enormous distances and resemble clouds of mist or gossamer veils sprinkled with stars. Dark rifts and apparent holes in dense star clouds are in reality dark nebulae absorbing light from stars beyond. In Cygnus the Milky Way separates sharply into two branches which can be easily traced to the southwestern horizon. It was in one of these branches of the Milky Way, in the constellation of

Aquila, The Eagle, that the brilliant Nova of June 8, 1918 appeared. This is known as Nova Aquilae No. 3 because it was the third nova to appear in this constellation. For a few days it far outshone Vega in brightness and then within a few months faded to a faint nebulous star. The news of the celestial catastrophe which the outburst of this Nova heralded arrived on earth several centuries after it happened! Just what caused this and similar outbursts that have occurred from time to time is still a problem, but undoubtedly they represent the great tragedies of the universe, possibly collisions of a star with a swarm of meteors or a nebulous stream. Perhaps they signify a sudden release of stellar energy under abnormal conditions.

Among the most interesting objects in the September skies are the Great Square in Pegasus, now well in view in the eastern sky, the beautiful Fomalhaut in the southeast in the constellation of the Southern Fish, and the little inverted Milk Dipper in Sagittarius in the southwest where the planet Saturn will now be found. Hercules is conspicuous in the western sky in September as are also the Northern Crown, the exquisite little diadem of stars west of Hercules, and Boötes with its brilliant Arcturus nearing the western horizon. Although Vega and Arcturus differ so greatly in color they are estimated to be almost exactly equal in brightness. Another interesting group of stars now visible east of Aquila and southeast of Cygnus is the small diamond shaped asterism known as Job's Coffin.

Interest in Planet X, as the new object discovered at the Lowell Observatory this spring is still generally known, is far from subsiding in astronomical circles. A variety of orbits have been computed but some months will probably pass by before a reliable orbit can be determined and its true nature discovered. There still seems to be considerable doubt as to whether a comet, asteroid or major planet has been discovered. The best information on the subject at present seems to indicate that it is either an exceptionally large and distant asteroid or a planet traveling in a decidedly elliptical orbit that is tipped at a much higher angle to that of the earth than is the case with any of the other planets. Possibly it will be necessary for the astronomer to admit the existence of a class of objects that are between major planets and asteroids in their characteristics to account for the peculiarities of the new object. It seems to be fairly well settled at least that the new member of the solar system is to be called Pluto. This meets with the approval of the staff of the Lowell Observatory and attention has been called to the fact that the abbreviation Pl. also forms the initials of Percival Lowell, whose study of the problem of transneptunian objects led indirectly to the discovery of Planet X or Pluto.

In the month of September we have not only the beginning of autumn, when the sun crosses the equator going south, but also we have the phenomenon of the Harvest Moon which is the full moon nearest to the date of the autumnal equinox. At this time of year the full moon when rising in the east is near the vernal equinox, where its orbit has the smallest inclination to the horizon. It follows that its time of rising on successive evenings is retarded much less than the average. In latitude 40° the moon rises about twenty minutes later on each successive evening for several days near the time of full moon. In higher latitudes the difference is even less. So at the time of the harvest the farmer who is working late in the evening finds that he is aided by the light of the Harvest Moon when he needs it most. The Hunter's Moon, which is the next full moon following the Harvest Moon, is also retarded in rising to almost the same degree as the Harvest Moon, as the moon is still near the the vernal equinox. As it happens this year there is a full moon on September 8 and again on October 7. The latter is about one day nearer the date of the autumnal equinox than the September full moon; so this year, strictly speaking, the Harvest Moon comes in October and the Hunter's Moon in November, though the September moon will be retarded in its time of rising on successive evenings almost as little as the October moon.

Autumn will begin on September 23 at 1:37 p. m., E. S. T., when the sun crosses the equator on its southward journey.

Venus is still a fine evening star. On the thirteenth it reaches its greatest distance east of the sun but is quite far south. It will then set about one and a quarter hours after the sun in the southwest. Mercury is not in good position for observation until the last of the month when it is a Morning Star and may be seen about fifteen degrees above the eastern horizon at sunrise.

Mars is now in Gemini and rises about 11:30 p. m. It is steadily growing brighter and is now equal to a star of the first magnitude in brightness.

Jupiter is also in Gemini and can easily be distinguished from Mars by its superior brightness and by the fact that it is a rich yellow in color while Mars is always a deep red. The two planets will be in conjunction on the twenty-sixth when Mars will pass north of Jupiter. Saturn is now visible in Sagittarius. On the twenty-ninth it will be on the meridian due south at sunset. It resembles a yellowish-white star of first magnitude.

The biggest state in the Union, as the next subject for a special number of Nature Magazine, is unusually rich both in material and in writers who can dig it out. Texas, to which the December issue will be devoted, is as large as England, France and Belgium combined, has a history colored with the hues of six flags, a bird, animal and plant life as varied and interesting as that of any other section, and some of North America's prize scenery. It is an inspiring issue that will be one of the best, if not the best, of our occasional geographic issues.

THINGS TO THINK ABOUT

A PAGE DEVOTED TO CONSERVATION FROM VARYING ANGLES

Gray Squirrel in England

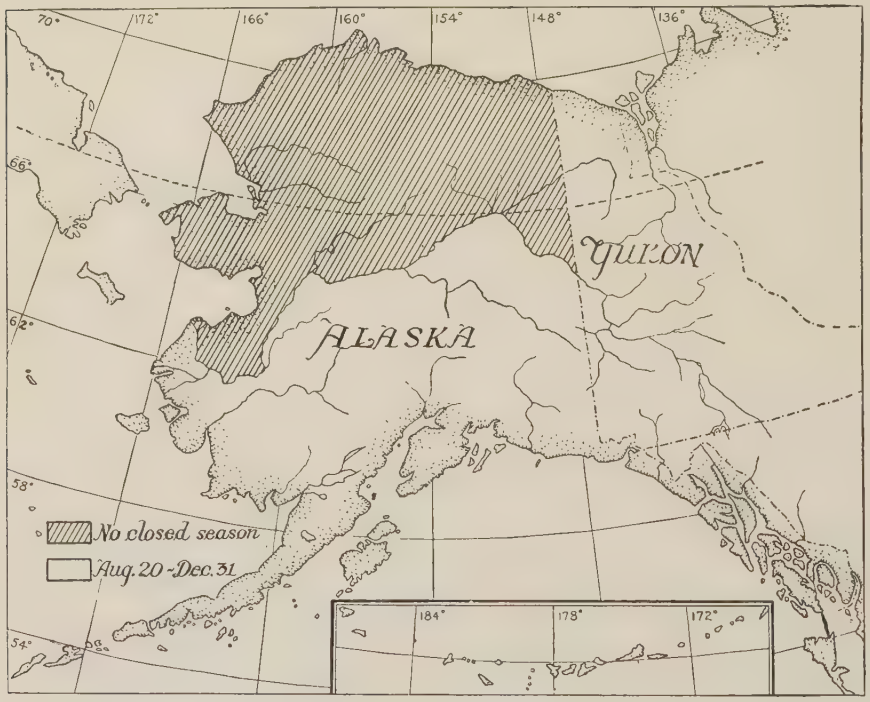
A lesson for those who are forever advocating the planting of exotic game species is afforded by England's experience with our own gray squirrel. About the year 1890 a few of these sprightly animals were liberated in the famous Woburn Park in Bedfordshire. They were much admired, and their possessors were envied. Others were turned loose in the London Zoological Gardens in 1905. There were a few other introductions.

The colonies prospered and extended their ranges to such an extent that they covered many of the counties and they are still spreading. They are now described as a national menace because of their depredations on fruit and nut trees, and a great variety of garden and orchard crops, and on the eggs and young of both wild and domesticated birds. Now guns and traps are enlisted in their destruction and the threat of classification as a fur-bearer is threatened. England is a country where the larger birds of prey are practically extinct and these natural checks cannot help.

The Bob-white in Indiana

A letter from a member of the Indiana State Audubon Society tells of her effort to have the bob-white removed from the list of birds that may be hunted for sport. The arguments advanced in opposition to this by the hunters and "conservationists" have a familiar, if not a convincing, ring. Many would not hunt except for the quail; the state would be deprived of the license fees; the hunters would shoot quail anyway; by allowing the birds to be shot they were protected by the hunter and fed in the winter; that quail were increasing in Indiana; that the protective law in Ohio was a failure, and that the birds were not increasing there.

But we notice that in Ohio people seem very well satisfied with the kind of protection they are giving the bob-white, and that some people there are kind enough to feed the birds without a high bag-limit. Such conditions will obtain too, in Indiana.



The Unlucky Caribou

About a year ago we had occasion to point out that the Alaska Game Commission, in whose hands rests the fate of her game birds and animals—incidentally, these are probably her most valuable resources—had seen fit to impose a year-long open season on caribou over all that part of Alaska north of the Arctic Circle. We are now sorry to report a further retrograde step in conservation—the extension of this condition to all the territory north of Yukon River. Only those who have become familiar with conditions in our northern territory, either by travel or study, can fully realize what this may mean to a species already greatly depleted. The reason for this extraordinary action is not divulged, but we suspect it arises from the inability of the authorities to police a region where a few stranded "sour-doughs" take a caribou for meat whenever they need one.

We seriously question the wisdom of this action. The neighboring Canadian Province of Yukon where conditions are similar has not found it necessary to deny all protection to this interesting species, though there, as in Alaska, it has long been the custom to allow natives and prospectors and travelers in need of food to take caribou at any time. This would seem in these days of increasing scarcity of nearly all forms of wild life to constitute a sufficient privilege.

Reference to the map will indicate the immensity of the area over which the caribou now receives no protection, even during the season of reproduction.

Hawks and Owls

To those who have seen in operation a so-called game farm, which is usually a place where pheasants are reared under domestic fowls and turned loose for sporting purposes, it does not seem so unreasonable that the owners should take steps to prevent their birds from being picked up by the bird-killing hawks. From owls these birds can be in but little danger, and game farms are not yet common enough to figure much, either as replenishers of the game supply, or as detriments to normal wild life increase.

The real danger, however, to our vanishing hawks and owls comes from the multiplying of reports, by game producing or game exploiting organizations, of what are in many cases isolated examples of undue destruction of game by these birds. From these a public interested in wild life largely from selfish or mercenary motives and little informed as to the true situation, is inclined to be encouraged to believe that predatory birds live mainly on game species and even that they are primarily responsible for their present rapid diminution. This, of course, is not true.

Michigan Protection

An even dozen species of birds which have earned, by their alarming decrease locally the protection of the Conservation Commission of Michigan, have recently been given further protection by being exempted from taking under "scientific collector's" permits. The list includes the sandhill crane, whooping crane, whistling swan, trumpeter swan, loon, bald eagle, osprey, pileated woodpecker, raven, Kirtland warbler, blue grosbeak, and mockingbird. While scientific collectors are reported not to have made serious inroads on the scattered numbers of these birds, the Commission feels that every agency should cooperate to protect them.

Ruffed Grouse Hunting

Though a bill extending another year's protection to the ruffed grouse recently passed both houses of the New York State legislature, Governor Franklin D. Roosevelt vetoed the measure, thus ending the much needed protection which the bird has been given for several years. Previous to his action, the Westchester County Conservation Association conducted an elaborate survey, report of which was sent to the Governor. The survey showed that in Westchester County at least, ruffed grouse were in no condition to withstand hunting. The report states: "Out of 96 field-trips in Westchester, two years ago, the grouse was recorded only 17 times, with a total of 23 birds." Nevertheless, the wishes of the sportsmen's organizations prevailed. It will be interesting—and somewhat sad—to see whether hunters can find any more grouse than trained investigators can, now that the fellow-governor and cousin of the great bird lover, Theodore Roosevelt, has made it possible for this remnant to be destroyed in New York State.

Helps and Hints
FOR HOME AND GARDEN

ANTING THE GARDEN, MONTH BY MONTH

By Romaine B. Ware

September is a welcome month with most rdeners as it ushers in the fall planting son. The summer gardens are truly de-htful and their bountiful crop of bloom ke them the feast of the year but the true rdener gets the greatest pleasure from nting things. We all seem to crave the w things and if our gardens are to display nething different each season, we must end to the planting. Throughout the most the country, fall planting is to be heartily ommended for practically everything ex-t plants that flower very late in the sea-. Of course many, many things may be nted at other times as well but fall is sidered by most gardeners as preemi-ntly the one best season for this work. The inexperienced may wonder why fall, beginning of the dormant season, is pref-ble for planting, as against spring when nts naturally burst into growth. One of important reasons is that with a vast jority of plants the fall and winter months not as dormant as they seem. Most plants ke considerable root growth during the called dormant months and careful ob-vers have noted that the buds of trees w appreciably larger during the winter nths though they are apparently complete-frozen. Henry Correvon, the noted hority upon alpines, writes of observa-is proving that plants solidly frozen ler a heavy blanket of ice and snow n the mountains clearly made growth formed buds during their six-month mant period.

Many experiments have demonstrated t practically all plants may be trans-nted with the least loss during this mant period. Active top growth is at a dstill, most of the sap has been with-wn into the roots and the plant is more less fortified to withstand the shock. A nt transplanted when in leaf is at a dis-t disadvantage because it is too actively ctioning throughout all its parts. Too, eriments have demonstrated that spring splanting frequently results in a check-of growth just actively begun and with e plants has resulted in setting them to such an extent that they never y recover. On the other hand fall nted material is all in place and ready the gradual awakening of spring.

There are some varieties of plants which ld be planted during the fall months at no other time. Peonies are probably most important of these. I know you find some growers offering to sell them he spring, but the vast majority of the er growers will only make deliveries ing September and October. Too, they tell you that early planted roots will blish themselves much better because

(Continued on page 193)

The Finest June Lilies

MADONNA LILIES *(Lilium Candidum)* and Royal Lilies *(Lilium Regale)* are the loveliest of all the Lilies.

Our bulbs are strong and well cured, ready for planting after October 1st.

American Grown Bulbs

Royal Lily

(Lilium Regale)

Beautiful waxen trumpet of pure white inside, flushed golden yellow in throat, stained pink and tan outside.

Selected Bulbs

6 to 7 inches circumference
$3.50 per Doz.; $25 per 100
7 to 8 inches circumference
$5 per Doz.; $40 per 100

Northern Grown Bulbs

Madonna Lily

(Lilium Candidum)

The oldest and most popular of all the Lilies, it has been beloved since men first began to make gardens. It grows erect, with snowy flowers in a spike near the tip of the stalk, and holds itself in chaste and simple loveliness above all other flowers.

Selected Bulbs

7 to 8 inches circumference
$3 per Doz.; $20. per 100
8 to 9 inches circumference
$3.50 per Doz.; $25 per 100

Our Fall Catalog, *"Bulbs for Autumn Planting"*, features the finest Tulips, Daffodils, Hyacinths, Crocus, Lilies and other Miscellaneous Bulbs. Sent upon request.

Branch Stores:
Newark, N. J.
Hempstead, L. I.

Stumpp & Walter Co
30-32 Barclay St., New York

Branch Stores:
White Plains, N. Y.
Stamford, Conn.

One of the Largest Growers and Importers of Bulbs for Discriminating Flower Lovers in the United States

PETERSON'S PERFECT PEONIES

FOR 25 years Peterson Peonies have set a standard for quality and reliability that has challenged comparison.

They are the result, not of an overnight hobby, but of a lifetime of loving devotion.

Do not place your order until you have received a copy of our 1930 Peony catalog (the quality of which reflects the quality of this business) ready for distribution August 1st and sent on request.

GEORGE H. PETERSON, INC.

Rose and Peony Specialists

Box 65, Fair Lawn, New Jersey

NATURE NEWS and VIEWS

A Wild Wolf Works

A wild wolf that "mushes" with the rest of the team through the snows of British Columbia is the prized possession of Fred Blanchard of Prince George. He is the animal in the middle of the above photograph. The timber wolf was taken in a trap during the winter of 1929-1930 and at last accounts was working well. Mr. Blanchard says that this is the only wolf that he has ever heard of being put to harness in his part of the country. At the time this photograph was taken by a friend of Walter P. Taylor, who kindly sent it to Nature Magazine, the driver and his dogs had been facing the sun and wind for fourteen days straight.

Seton in his book on the life histories of the northern mammals relates two instances of a similar character. The Rev. J. A. McLaughtlin of Berens River, Lake Winnepeg, wrote him of an Indian who caught a "splendid black wolf" in a trap, hitched him up to his dog train, and made him help haul his load of fish. D. T. Hanbury, on a trip from Selkirk to Norway House, reports riding in a sleigh drawn by a team that included a wolf. "The animal was muzzled, and though rather savage, worked well," the witness reported.

Snakes and Their Young

Another story of snakes swallowing their young comes from Australia. H. H. Burgess of East Melbourne, who recites it, writes that he saw a large black snake perform the feat while he was waiting nearby to get a shot at the creature. He had earlier in the day spied the reptile, but it had got away, and knowing that it had the habit of sunning itself nearby, had waited for it. It finally came in sight, and he was about to fire when he saw the animal open its mouth to let out sixteen youngsters in single file. It was a hot day in December, he relates, and the brood was very lively. For more than half an hour they played gaily. Finally he threw a stick at them, and instantly the mother reared up two feet from the ground and began to hiss. Then it lay flat against the ground, opened its mouth, and the young, wriggling from all directions, descended in procession. Mr. Burgess then killed the snake, cut off its head and watched the entire sixteen, much alive, swarm forth.

We Want Them, Too

The rangers of the California District of the U. S. Forest Service don't ask for much, but below is a list of a few things they do want. Now if it were only Christmas time, and there was a Santa Claus:

Matches that use their heads when their owners don't.

Cigarettes without a forest fire in a trainload.

Cigars that go out when dropped.

Empty cans that automatically roll themselves into garbage pits.

Newspapers that decompose when left lying around.

Signs that rebound the bullets at vandal shooters.

Campers who never fail to extinguish their camp fires with water

Motorists who carry ash receivers in their cars and use them.

Hunters who only shoot after they see horns.

Fishermen who never clean their catch in a stream or lake.

Tourists without a mania for writing their names on sign boards.

Nature lovers who do not destroy the flowers, shrubs and trees.

Good citizens who realize their responsibility to prevent forest fires.

State and Local Floras

A list of books on flora of different parts of the United States has recently been compiled by Alice C. Atwood, and is being distributed by the Wild Flower Preservation Society, Incorporated, 3740 Oliver Street, Washington, D. C. The list includes only comparatively recent works, some of which may be out of print, but are available in large libraries and in second-hand book stores. The list will be sent free of charge to District of Columbia and National members of the Society, and is obtainable at fifty cents the copy to others. Since no list of state floras has been published since 1890, this bulletin serves a most useful purpose.

Our Billion Dollar Ailments

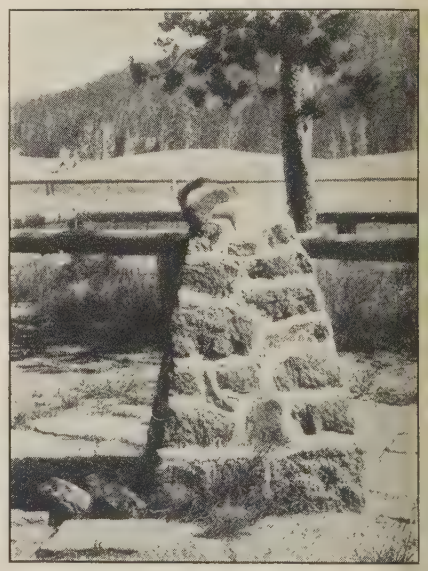
Plant diseases in the United States cause the loss of one billion and a half dollars, according to the estimates of R. J. Haskell, plant pathologist of the U. S. Department of Agriculture. The wheat crop is reduced by ninety-seven million bushels, the corn crop by two hundred and seventy-one million bushels and the potato crop by ninety-five million, he states. In Canada the losses run to about seventy-five million dollars.

Wild Rose Song

Mrs. Gertrude T. Hamilton, the author of "Violets and You" and other popular songs, has recently produced "My Wild Rose of America", dedicated to the wild rose, the selection of the people in the National Flower Campaign conducted by the American Nature Association. Copies may be secured from Mrs. Hamilton at Peters, California.

The Oldest Outdoor Page

Michigan is fortunate in having more newspaper space, per population, devoted to the out-of-doors than any other state in the Union, and has been a pioneer in a movement that is growing each year. The first paper to inaugurate the policy, according to Jack Van Coevering, Michigan writer and Nature photographer, was the Grand Rapids *Herald*, which devotes two pages in every Sunday edition to news from the world of Nature. The editor of the department is Carl Maxon Saunders, writing under the pen name of "Max Sandy". Mr. Van Coevering writes: "I believe that the time is not far distant when newspapers in other states will discover the distinct reader appeal of the outdoor pages." Some publications, of course, have made the discovery already, and the list steadily becomes longer.



A Sanitary Squirrel

"What books on hygiene the animals in Yellowstone National Park read remains a mystery to members of the park ranger force but at least one pine squirrel in the Old Faithful region has learned that it is more sanitary to use the drinking fountain installed for the convenience of park visitors in front of the Old Faithful Ranger Station than to drink out of tin cans, horse troughs or stagnant pools." Thus writes Joseph Joffe, ranger at Yellowstone National Park, concerning the squirrel whose picture appears above.

"One day, while awaiting an eruption of Old Faithful Geyser, with my camera set at fifteen feet to include some trees in the foreground as a frame for Old Faithful herself, I was disturbed by the appearance of a pine squirrel running swiftly over the ground, mounting the side of the drinking fountain and indulging freely in the cold water which issued forth," Mr. Joffe relates. "Forgetting for a moment that Old Faithful was about to perform in all her splendor, I pressed the trigger on the camera and 'shot' Mr. Squirrel.

"The rangers at the station later advised me that this particular squirrel, which they have dubbed 'Sanitary,' has been following this practice for several years and that three or four times each day he makes the trip to the drinking fountain, regardless whether or not there are people present, and imbibes in the 'free drinks' at the expense of Uncle Sam."

HELPS AND HINTS FOR HOME AND GARDEN

(Continued from page 191)

considerable growth will be made during the first few months. I have had occasion late in October to dig up peony roots, planted the first week in September, and have found many new roots several inches long. This early root growth, together with that which will take place in the next few months, means that by the time top growth gets above the ground in the spring the plant will have sufficient roots to adequately nourish it.

The modern peony is a rather highly developed plant and some of the finest varieties have been known to resent being disturbed in the spring to the extent of sulking and refusing to bloom right for many years. With fall planting, however, there are seldom any difficulties, provided they are planted right, and this is a very simple matter. Peonies require a well drained location, full sunlight at least half the day and planting at the proper depth. This latter requirement is absolutely essential. They will thrive in most any average good soil; they resent manure in contact with their roots or used as a mulch. As to depth of planting, the roots must be placed so that the buds or eyes are two to two and one-half inches below the surface of the soil. If planted too deep or too shallow peonies seldom if ever bloom right.

Holes at least two feet deep and as large in diameter should be dug, some compost, thoroughly rotted manure or chopped up sod should be placed in the bottom of the hole but good top soil only must be used for the upper ten inches and the soil must be well settled so that after the roots are planted it will not sink down, carrying the plant too deep. Plant firmly and water well to encourage the root growth to start.

Peony varieties are most important as few plant species are as highly developed to where quality counts. I'll just list a dozen at reasonable prices that are excellent, look them up in the catalogues—Mons. Jules Elie, Frances Willard, Baroness Schroeder, Sarah Bernhardt, Mme. Jules Dessert, Avalanche, Marie Emile Lemoine, Marie Jacquin, Marie Lemoine, Adolph Rousseau, Richard Carvel and Karl Rosefield. Among the best at any price are Kelways Glorious, Solange, Philippe Rivoire, Enchanteresse, Mrs. A. M. Brand, Myrtle Gentry, Therese, Le Cygne and Jeannot. Of course these lists are entirely a matter of taste and other peony fans might suggest other varieties, but every one suggested here is a high grade variety.

Fall planting takes in practically all kinds of perennials except those that bloom very late in the fall. These are best left until early spring. Varieties that are through blooming for this season may be moved at once and the rest of them later. The ground where new plantings are to be made should be well prepared and enriched as most perennials are rank feeders and generally remaining in one place several years soon impoverish the soil. Good preparation demands spading the soil to a depth of twelve inches; trenching to eighteen or twenty-four would be much better, as many varieties are deep rooted. The same applies where borders are being made over. The

(Continued on page 195)

The Best Time To Plant Your Rockery

BULBS

Include some in your order. Frankly, we never had a finer lot, or more fairly priced. We imported them all straight from Holland. Order now for October planting.

Wayside Gardens

MENTOR, OHIO

Reg. U. S. Pat. Off.

SEPTEMBER is the best time. Fortify yourself against disappointments. Plant husky field grown clumps. Good big clumps having lots of strong roots. You can get them from us. Furthermore, if any of them fail to reach you in good condition, we guarantee to promptly and cheerfully replace them at no cost to you. Send at once for our free catalog. Do your planting in September. It's the best time to plant your Rockery plants.

BULB BOOK FREE

Tulips, Hyacinths, Crocus, Daffodils, Peonies, Iris, and many others to plant in the fall—read all about them in **Burpee's Bulb Book.** It tells you of the best spring-flowering Bulbs, Perennial Plants, Roses, Shrubs, etc. Also of flowering bulbs for winter blooming in the house. Write for your free copy today.

W. ATLEE BURPEE CO.
831 Burpee Bldg., Phila., Pa.

Beautiful Hardy Azalea FREE

The Azalea is one of the most brilliant and beautiful of the early flowering shrubs. Flowers cover the bush when color in the garden is scarce. Add the charm of the Azalea to your garden; use them for foundation planting. Easily grown, but always high priced. We have a large stock to enable us to make this unusual offer.

40 Darwin Tulips $2.00

100, $4.00; 500, $18.00; 1,000, $35.00

Beautiful Big Darwins. Choice assortment of colors. All largest size bulbs. Sure to give perfect satisfaction. This we guarantee.

Separate Colors

Scarlet, crimson, pink, violet, salmon, white, yellow.

40 for $2.25; 100, $4.25; 500, $20.00; 1,000, $38.00

These are as choice bulbs as it is possible to obtain. With each order, a Hardy Azalea will be included FREE. Four Azaleas with each order for 500 Tulips.

A Bed of Early Spring Flowers FREE

Grape Hyacinths, beautiful heavenly blue flowers, brilliant soon after the snow goes. Thrive for years in sun or shade. Good for pot culture and cut flowers. Twenty-five choice bulbs FREE in place of Azaleas, or Azalea and Hyacinths sent with two orders for 40 Tulips.

Order at once. Write for Catalog of Bulbs, Perennials, Roses, House Plants, Vines, for Fall Planting.

JOHN LEWIS CHILDS SEED CO.
Established 1876
7 Childs Ave. Floral Park, N. Y.

Scott's Creeping Bent for Perfect Lawns!

Sod in six weeks. A rich, velvety stretch of lawn that chokes out weeds before they can grow! A deep, thick, uniform turf that's everlasting and that makes your home a beauty spot.

The New Super Lawn

Instead of sowing seed, you plant stolons or the chopped grass—and in a few weeks you have a luxuriant lawn like the deep green pile of a Turkish carpet. Read all about this unusual grass in our illustrated booklet "Bent Lawns." Mailed on request. Fall is the best time to plant.

O. M. SCOTT & SONS CO.
561 Main Street, Marysville, Ohio

TEN CACTI

Blooming size **All different**

Postpaid for $2.50

Table garden size $2.00

JAMES ALLAN
Mountain Park **New Mexico**

PEONIES *and* IRIS

Prices cut to the limit

for quick disposal of our choice collection of over 300 varieties to make room for the Parkway.

Our illustrated catalog offers many garden-building, money-saving opportunities.

S. G. Harris, Box N, Tarrytown, N. Y.

What makes a good
PLANT LABEL GOOD?
It must be impervious to moisture, must retain its markings, and must not girdle the Plant—WE HAVE IT.
Sample Line for the Asking
THE AQUAPROOF PRODUCTS CO.
2175 East 76 St. Cleveland, Ohio

A. E. WOHLERT
The GARDEN NURSERIES Narberth Pa.

Oriental Flowering Trees
America's Finest Collection
Japanese Rose Flowering and Weeping Cherries, Flowering Crabs; in all varieties and sizes. Send for free book with color illustrations.
A. E. WOHLERT
927 Montgomery Avenue
Narberth, Montgomery Co., Pa.

NATURE IN PRINT

Re Ponds and Streams

"To make the knowledge of the whole range of life in ponds and streams a little more easy of access" is the major purpose of the *Field Book of Ponds and Streams,* by Ann Haven Morgan, professor of zoology at Mt. Holyoke College. The book, one of G. P. Putnam's Son's series of Nature field books, describes the different forms of plant and animal organisms which inhabit the waterways of the country. Miss Morgan has given exhaustive information on the collection and preservation of water animals, as well as detailed accounts of the simple and higher plants. No type of water life has been neglected in this thorough and comprehensive study. The volume, amply illustrated, forms a worthy companion to *American Wild Flowers, North American Mammals* and others of the Putnam series. The price is $3.50.

Hoosier Rhymes

The land of James Whitcomb Riley, Senator Robinson and William ("Ain't God Good to Indiana") Herschell has inspired another book of poetry—*Hoosier Rhymes and Readings,* by Virgil Ray Mullins, of the Indiana State Teachers College at Terre Haute. While making no pretense to greatness, the verse is distinguished by its attempt at the vernacular and by considerable insight into the feelings, thoughts and aspirations of the rural Indianian. The volume, made attractive by photographs and drawings by Marian Hetherington Marsh, is published by the Benton Review Shop, Fowler, Indiana.

The Long Trek

Somehow, we cannot get greatly enthused over *The Long Trek,* by Richard L. Sutton, published by the C. V. Mosby Company of St. Louis, and are apt to disagree with the statement on the cover that it is "one of the outstanding travel volumes of the present generation." It is a recital, decidedly chronological, of Mr. Sutton's hunting and photographing trip through Africa and Asia. Those planning to travel over the same country will find in it many useful facts; probably its most interesting characteristic is its rather thorough study of several of the native tribes encountered by the expedition. The pictures are of more worth than the text, but most of them are "posed". Perhaps our failure to grow excited over the book is derived from the fact that much of it is devoted to the shooting of big game animals. One paragraph taken from page 151 will indicate its tone: "as a rule, we judged our distances incorrectly, and overshot or undershot. For instance, Dick, while trying for zebra one day, shot the same animal through the left front leg three separate times! And my record was even worse. But we had at last added the lions and leopards to our list, and after all, this made life worth while." We always did want to know. The book is priced at $5.

The White Mountains

No other hill country in the United States duplicates exactly the White Mountains of New Hampshire. Elsewhere, peaks may tower higher, mountain streams broil more noisily, cliffs drop dizzier heights, and tourists heave bigger sighs, but that region embraced by the northern part of the Granite State has all the charm that goes with little things, together with a touch of the grandeur that goes with great proportions. Perhaps its beauty lies in the low-tree line, where gnarled and distorted conifers give way to lichen-covered granite boulders at an altitude of 3000 feet. Perhaps it is the view, from the peaks, of endlessly billowing green punctuated here and there by the blue glimmer of lake or twisting river. Perhaps it is the clouds, that play over the mountains and often shroud them in heavy wreaths. Whatever the appeal, it is almost irresistible to those who know the White Mountains.

But it is the purpose here to sing not the praises of the Mountains, but of one of the most delightful books ever written about them. *The Book of the White Mountains* is, in this reviewer's opinion, the best travel book that has ever come out of New England for many a day—which may, after all, seem to be like damning with faint praise. The authors are John Anderson, New York dramatic critic who flees from "The Green Pastures", Eva La Gallienne and Mae West to New Hampshire on vacations, and Stearns Morse, English professor at Dartmouth college, where "they have the still North in their hearts, the hill winds in their veins," and where the White Mountains are as much a part of the curriculum as the "Five hundred gallons of New England rum" and Sociology 1 and 2. No ordinary guide book have they written. In delightful prose punctuated with epigrammatic humor and witty observations in perfect good taste, they have described every corner of the Mountains accurately and dispassionately. There is no fine writing, no attempt to "match tall pinnacles with tall words." Much of the interesting history of the region has been recast by their pens into a dramatic story that clings as tenaciously to the truth as the firs to the hillside. They seem to have caught the spirit of the pioneer mountain folk and their chief characteristics without either caricaturing them or placing them on pedestals. As interesting as any phase of their writing has been their comments and quotations from previous commentators on the region—thus the book is something of a literary history as well as a guide book. He who seeks information about trains, places, views, hotels will find it complete and up-to-date. The more desirable reader who loves good writing about interesting objects will find it as enjoyable as Hilaire Belloc's *Hills and the Sea.* A book as free from superlatives as a saint from sin (in just about the same proportion), filled with sly humor and excellent prose, and honest and just in its estimates is a novelty these days. But such is *The Book of the White Mountains.* The price is $5; the publishers, Minton, Balch and Company, New York City.

Dog Stories

If *Bolio and Other Dogs,* by Archibald Rutledge, does not stand out like Vega it is because the constellations of dog stories have thickened considerably since the days of Jack London and *The Call of the Wild.* Bolio is a collection of short stories about dogs that differ in disposition and quality from Bolio, who killed a mountain lion, to Boll-weevil, who went after quail and turned up with a buzzard. Mr. Rutledge is obviously a dog lover, with sympathetic understanding of canine nature. His stories are interesting; his style somewhat unusual; his plots lack suspense. The book is priced by the publishers, Frederick A. Stokes Company, at $2.

Animals Speak

Do animals think? Are their reactions as clearly understood as those of humans? This problem has long baffled scientists, and until it is settled books that tend to put smoothly-rippling prose into the mouths of crows and rabbits and squirrels are, to the serious minded, misleading. In such a class falls *Animal Autobiographies,* by Edward Huntington Williams, but some of the curse is taken away by the Introduction, which states that only the words of the animals that speak are imaginary; their doings are real. Even with this warning, however, the reader, and especially the young reader for whom this book is adapted, is apt to believe, at the end, that the mental processes of the four animals Mr. Williams biographizes—the crow, jackrabbit, squirrel and woodchuck—are quite human. Despite this objection, however, Mr. Williams' book is delightful, contains much pertinent information about the four creatures, and gives an accurate account of their physical—if not their mental habits. It is published by the Williams and Wilkins Company for $1.

Yosemite Birds

Miss Enid Michael, ranger naturalist of Yosemite National Park, has taken over the entire June number of Yosemite Nature Notes with a thorough and delightful study of the birds that commonly nest on the Yosemite Valley floor. Each bird is carefully described as to habits and appearance, and a large number are graced with accurate line drawings, some of which are presumably made by the author herself. Yosemite Valley is a haven both for birds and bird students, and this booklet, appearing just at the beginning of the tourist season, will be deservedly popular. Copies may be obtained from C. A. Harwell, Park Naturalist, Yosemite National Park, California.

English Sparrows Again

The Department of Agriculture has recently issued Department Leaflet No. 61 on the control of the English sparrow. The paper is prepared by E. R. Kalmbach, Senior Biologist of the Bureau of Biological Survey. The booklet may be had on request, made to the Department at Washington.

HELPS AND HINTS FOR HOME AND GARDEN

(Continued from page 193)

oil in old borders is generally more or less sed up and it needs a thorough rehabilitaion and the replenishing of its food upplies.

In these days when barnyard manure is ometimes difficult to secure, many gareners are at a loss for a substitute. The ifficulty with commercial fertilizers is lack f humus so necessary to maintain soil in ood condition. Compost or some form of ommercial humus together with commerial fertilizer makes an ideal mixture. Ground bone in various forms is a good ood to add to the soil. Steamed bone meal egins to become available within a few veeks after application, raw bone meal a ew months later and coarse bone or button one six months to a year later. The food lements of bone meal can thus be stored p in the soil and become available as the lants need it. When preparing the soil it s easy to add adequate supplies of plant ood and mix them in well, down where he roots may reach out to it.

The planting of shrubs and trees should ot be attempted till they become practically ormant, a state indicated by the falling f their leaves, generally from the action f frost. At that time they may be moved vith comparative safety. With all trees and hrubs, it is important to destroy as little f the roots as possible. Except for nursery pecimens, moved with adequate balls of oil, it is almost impossible to avoid the oss of some roots and when you remove ny part of the roots, a proportionate part f the top should be pruned off to balance ings up. Nature always tries to maintain perfect balance between the mass of roots nd the top growth they support. When oots are destroyed the plant is at a great isadvantage till the balance is again estabished. Given time, many plants will prune hemselves by allowing branches to die ack but this is not an economical way to andle them. The use of pruning shears is ist as important as any other garden act.

The great group of spring flowering ulbs must be planted in the fall. Narcissus hould go in early as possible, but tulips n wait a little later. The former seem o need the fall months to establish themelves. However, once properly planted, arcissus can remain undisturbed for sevral years unless you are particularly interted in a rapid increase of your stock. In is case the bulbs should be lifted each ar as soon as their foliage has fully pened. There are many other spring and rly summer flowering bulbs that may be anted now and they will all add to the y of your garden next year.

With all fall planted material, there is ie thing that must not be overlooked. hile much root growth is made, these ants are far from being firmly rooted to e soil and unless given protection in the ape of a mulch, the frosts and freezing winter may heave them out of the ound or at least raise them to the extent disrupting the new root growth. It is solutely necessary that all fall planted aterial be lightly mulched just as soon as e ground is frozen.

Gorgeous Springtime Blooms

SHUMWAY'S "Pedigreed" Bulbs

You will have a beautiful springtime garden if you plant Shumway's "Pedigreed" Bulbs this fall. They are Holland grown and carefully selected for particular planters. Largest sizes guaranteed.

Our 60-year record of business integrity is your assurance of quality bulbs that will produce gorgeous blooms. Reasonable prices. Delivery charges prepaid.

Superfine Mixtures—Largest Size Bulbs

100 Darwin Tulips	17 Varieties		$ 3.85
100 Breeder Tulips	15	"	4.00
100 Cottage Tulips	12	"	4.00
100 Early Single Tulips	12	"	4.25
100 Early Double Tulips	12	"	4.25
100 Parrot Tulips	5	"	4.00
100 Hyacinths	10	"	11.50
100 Crocus (1¾"—2" dia.)	5	"	3.90
100 Narcissi, U. S. Grown	5	"	8.75

50 Bulbs at the 100 Rate

Extra Special—12 Louis XIV Breeder Tulips, Purple, Gold Margin, 90c; fifty for $3.50; 100 for $6.25

All varieties grow 2 to 3 feet tall. Giant bloom.

100 Princess Elizabeth	Rose Pink	$ 4.75
100 Baronne Tonnaye	Vivid Pink	4.75
100 Bartigon	Carmine Crimson	4.75
100 Clara Butt	Salmon Pink	4.50
100 La Tulipe Noire	Nearly Black	6.00
100 Valentine	Violet	5.00
100 Scarlet Beauty	Scarlet	5.50
100 Inglescombe Yellow	Yellow	4.75
100 Golden Bronze	Name describes it	4.75
100 Farncombe Sanders	Rose Scarlet	4.75
100 Rev. Ewbank	Lilac-blue base	4.75
100 Cardinal Manning	Rosy Violet	4.75
100 Dream	Delicate Lilac	4.75
100 Pride of Haarlem	Carmine Rose	4.50
100 Mme. Krelage	Lilac Rose	4.75
1500 bulbs—100 of each		68.00
750 bulbs— 50 of each		35.00
375 bulbs— 25 of each		18.50

FREE CATALOG

in full colors, pictures a great variety of Tulips, Narcissi, Hyacinths, Crocus, Peonies, Lilies, etc. A helpful guide to gardening, free. WRITE TODAY!

R. H. SHUMWAY, Seedsman

121 S. First St. *Established 1870* Rockford, Ill.

12 TULIPS FREE

PFEIFFER

SPECIAL Full Details Telling How Pfeiffer Customers May Obtain 12 Assorted Tulips, Free, Given in our Catalog which is Free for the asking. Other Gift Offers, also.

THE Famous Winona Flower Specialists, propagators and growers of many Flower Show Prize-Winners. Now selling direct-from-grower-to-planter. Enables all Flower Lovers to secure their wants at lowest prices. Pfeiffer's extraordinary Collection Bargains and Get-Acquainted Offers are the first opportunity ever offered to replant your garden or extend it or start a new one with **Pfeiffer Quality IRIS—PEONIES—PHLOX, TULIPS, etc.**

Anyone ordering promptly will get *Lent A. Williamson Iris FREE* when ordering our surprise Iris collection of assorted varieties and colors. Entire collection. postpaid.

25 Iris (postpaid) $1.35

Order promptly and get *Charles McKellip Crimson Peony* (worth $1.00) *Free*, with our special Peony collection, consisting of 2 Red, 2 White, 2 Pink Peonies.—

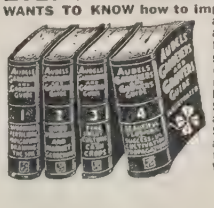
6 Peonies (postpaid) $2.00

TULIP SPECIAL

100 Darwin Tulips $3.00. Extra Fine. Strictly first class Bulbs in a very fine assortment of colors. A collection that will please you. A bargain you can't duplicate anywhere.

THE PFEIFFER NURSERY
Dept. 125 Winona, Minn.

EVERY GARDENER AND GROWER
WANTS TO KNOW how to improve the soil and grow more and finer vegetables, more and better fruit, the finest flowers, plants, trees and shrubs, hot house methods, etc. All told by E. C. Vick in 4 new books that answer problems and assure success. Price $6. Sent free on approval, payable $1 a month if satisfied. Send name today and get books at publisher's risk. Garden folder free. THEO. AUDEL, 65 W. 23 St., New York. Dept V25



Narcissi Peonies Irises

Also Jonquil Hybrids. Send for catalogue

Narcissus Mixture of many tested varieties, earliest to latest, $3.30 per 100, $30.00 per 1000, delivered.

Peony, Mikado, famous red and gold Japanese variety, $1.00, postpaid.

ORONOGO FLOWER GARDENS
Carterville, Mo.

North American Wildflowers

THESE are the plants we like best. Their charming shyness and purity of colors make the exotic immigrants with their gaudy brilliance seem like overdressed fakirs.

Our new catalog of Native Ferns and Wildflowers lists not only our own lovely New England plants, but a great many from the Southern Appalachians, the Prairies, the Sierras and the Rockies. Plants for the bogs and streams, for cool, moist shaded rocks and for the dry, blazing hillsides.

Special Collections

Plants for the shaded rock garden

12 American Columbine	$2.00
12 Dutchman's Breeches	2.00
12 Foamflower	2.00
12 Crested Iris	2.50
12 Sharplobe Hepatica	2.00
12 Berry Bladderfern	2.00
Total	$12.50

48 Rare Hardy Orchids

12 Moccasin Flower	$2.00
6 Yellow Ladyslipper	1.75
6 Showy Ladyslipper	2.00
12 Rose Pogonia	2.50
6 Purple Fringe Orchis	1.75
6 Showy Orchis	1.75
Total	$11.75

EITHER of the above collections will be sent to you for $10.00 or for $5.50 we will send you one half of either collection, you to pay postage.

Be sure to send not only for our catalog of Wildflowers and Ferns, but also for our regular catalog which lists all sorts of Evergreens, Trees, Shrubs, Berry plants and Perennials.

GEORGE D. AIKEN

Box Z, Putney, Vermont

★ *"Grown in Vermont, It's Hardy"* ★

PLANT TREES FOR WASHINGTON

By Charles Lathrop Pack

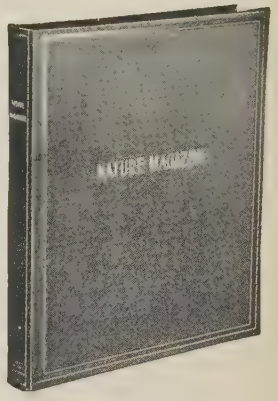
(Continued from page 178)

but a beautiful nation. Though a man of practical affairs, he found time, as his writings and actions showed, to cultivate the aesthetic side of life. The site of Mt. Vernon is proof of his love of natural splendor. No form of tree-planting could be more fitting than that which lines the roadways of the nation with forests in single file. Trees hide billboards and unsightly scenes. They form a frame for the countryside vistas. George Washington trees will make of every turnpike and highway a Road of Remembrance, along which countless people will travel to recall the deeds and teachings of the Father of his Country. There are many of these Roads of Remembrance throughout the land now. An "Avenue of the Presidents" has been planted near Canton, Ohio, where the Lincoln Highway nears the tomb of William McKinley. The trees along the main highway from New York City to Buffalo, New York, have been dedicated to the memory of the New York soldiers who died in the World War. Famous Sixteenth Street in Washington, D. C., at the head of which stands the White House, has a tree for every gold star on the District of Columbia war-time flag, and on Poppy Day, poppies are placed at the base of each one. In no better way could an enduring tribute be paid to the First President than to change our sun-baked roads into leafy bowers of cooling shade.

If Washington were alive, he perhaps would deem most expressive of his place in the thoughts of the people the town or community forest, such as civic governments and organizations are already planting. Washington hated waste. He wanted to find a use for everything. Cold marble, however exquisitely carved, impressed him little if it did not serve a purpose. A forest, however, is more than a memorial—it is a civic asset. Many towns are paying a goodly share of their taxes with the annual cut from the tree-ladened acres of their town forests. As much as $3 or $4 an acre net income may be derived from such a source. The forest is more than an economic proposition; it becomes the recreational center, it serves to protect the watershed and the bird and animal life of the region; it increases the scenic, and hence the economic value of the town, and last but far from least in these disturbing days, it furnishes a source of winter employment. How Washington would have desired such a token of the esteem of his fellow countrymen—a token that honors him as much as statuary, yet strengthens the community so much more.

Each city and town, each individual, each organization will have its own problems in planting for George Washington. The town or state highway engineer should be called into consultation for roadside planting, and he will gladly cooperate. The State Forester, always willing to lend his talents and aid freely, is best fitted to advise as to the care of town and other forests. Individuals and groups will be able to call on the commercial nurseries which supply their trees for full information. The American Tree Association will send to all who write for it a "Bi-Centennial Tree Planting Book," containing advice as to when to plant them, and a brief summary of the rules of planting.

UNIQUE GIFTS



Bound Volumes

Vols. 2, 3, 5 to 14 inclusive

(Vols. 1 and 4 all sold)

NATURE MAGAZINE

at only $3.00 *each*

These volumes (six issues) are bound into attractive books with dark green cloth covers and gold lettering. They contain a wealth of fascinating stories about birds, animals, fish, plants, insects, trees, and other phases of Nature and the outdoors.

The supply is limited

Order Now from

AMERICAN NATURE ASSOCIATION

Washington, D. C.

Insect Pests of every kind

are quickly and easily

destroyed by the use of WILSON'S O. K. PLANT SPRAY . . . for over a quarter of a century the nationally recognized standard insecticide. Recommended by the Officers of The Garden Club of America. Half-pint 40c; Quart $1.00; Gallon $3.00; 5 Gallons $12.00; 10 Gallons $20.00.

Trade Mark Registered

Wilson's O. K. Plant Spray is sold by leading stores everywhere and the genuine may be identified by the famous Trade Mark. Write us, if your dealer cannot supply your requirements.

Kill weeds the Wilson way . . . simply dilute *Wilson's Weed Killer* (1 Gallon to 40 gallons of water) . . . sprinkle . . . that's all. The modern way to exterminate all weeds, poison ivy, vines, etc. One good application a year is sufficient. Inexpensive . . . clean . . . odorless. 1 gallon $2.00; 5 gallons $8.00.

Andrew Wilson INC.
Dept. V9
SPRINGFIELD, NEW JERSEY

100 EVERGREEN TREES $3.50

Western Maine Forest Nursery FRYEBURG MAINE

Buy From Grower At Wholesale

Beautify your home with these vigorous hardy trees, four years, transplanted and well rooted. Average height 4-8 inches. Started in severe Northern climate, they will thrive anywhere and grow rapidly.

NORWAY SPRUCE SCOTCH PINE
WHITE SPRUCE NORWAY PINE

100 of any variety or 25 of each kind **$3.50**

For immediate shipment. No shipment later than Dec. 1 because of early Northern winter. No shipment of less than 100. Average weight 10 lbs. per hundred. Remit with order.

WESTERN MAINE FOREST NURSERY
Dept. N FRYEBURG, MAINE
Send for Descriptive folder

Plant Maule Bulbs

You can have *gorgeous flowers* in your garden next spring and in your home this winter. Plant Maule bulbs this fall. Low cost. Little effort. Wonderful blooms.

The MAULE Fall Bulb Book **FREE**

Tulips, Hyacinths, Narcissus, Crocus and many other bulbs for fall planting. All our bulbs are full of vigorous, virile life. Any one can grow them. Send for book today.

WM. HENRY MAULE
405 Maule Bldg. Philadelphia, Pa.

"Plant for George Washington." This is the cry that is going up in all parts of the country. Plant now, or in the spring, or any time before the year 1932, so that strong, healthy trees will be firmly rooted in the native soil when they are dedicated in the name of the "Father of our Country" on February 22, 1932. The first of the 10,000,000 leafy monuments have been erected. The first George Washington town forests, Memorial Roadways and Memorial Trees are in existence. Every citizen in every city and village—and more important, every future citizen—is hearing of the plans for paying the greatest honor ever paid to America's foremost hero. The Second Continental Army is mobilized and is moving into action. That Commander-in-Chief who was "First in peace" is leading it forward. It is through love for him, and for his precepts, that the inspiration for this Army of tree planters is derived. When another two hundred years have come and gone, there will be a stronger and more resplendent people because these trees will emphasize to posterity the spirit and influence of George Washington in American history and progress.

Slaughter of African Animals

We are led to quote in part from an able article that appeared in the London Field of May 10, 1930. We believe that it is rather well established that it is impracticable to stamp out such species as the tsetse fly, or any similar pest, by wholesale slaughter of the large animals that are their hosts:

Slaughter in Zululand

"One of the most difficult problems with which the administration of any 'new' country is faced is that of holding the balance between the just claims of the settlers and agriculturists and those of the wild life indigenous to the country. The days have now happily passed when the fauna of any district freshly opened for the settler was regarded solely as his legitimate prey; something to be killed off wholesale in order to provide as much profit as was possible from the sale of the meat, either by means of barter or cash, or of hides.

"In the past South Africa has not enjoyed a very enviable record in this respect, but the danger was fortunately realised in time—although only just in time—and the establishment of the Kruger National Park in the Sabi district has ensured for posterity the preservation of numerous varieties of wild life which can only bring joy to the lover of nature as well as become an asset to the country.

"America, too, has been through the mill, with the result that the Yellowstone Park is now regarded as a valuable national trust.

"In Zululand, however, a section of the white population have for the past ten years regarded those creatures which are commonly and vaguely termed "game" from an altogether different viewpoint. This section is both vocal and powerful, but that it is in a real majority we decline to believe. In 1920 it organized a vast 'game drive', in which hundreds of animals were slaughtered, and even greater numbers wounded and left to linger in misery; the 'shottists' as they seemed to be locally called, firing indiscriminately into herds of

Those Restful Ferns

We think of Tulips as "gorgeous", of *Dahlias* as "spectacular", of Delphiniums as "stately"—but for a real, restful and "homely" atmosphere give us Ferns! Their nodding fronds invite us to linger. Transform your garden into a haven of peace and rest by planting more Ferns.

Collection No. 3

Holds nine splendid varieties of varying heights, especially adapted to moist, shady situations as well as large rock gardens, as follows:

Adiantum pedatum
Aspidium cristatum
Aspidium acrostichoides
Aspidium spinulosum
Aspidium marginale
Asplenium thelypteroides
Asplenium Filix-foemina
Phegopteris hexagonoptera
Woodwardia virginica

5 plants each of 9 varieties; 45 fine clumps in all for $6.

Collection No. 5

Comprises 4 varieties particularly suitable for dry rocky ledge or rockery. All are low-growing evergreen ferns, lending beauty the year round.

Aspidium Thelypteris
Onoclea sensibilis
Osmunda regalis
Woodwardia virginica

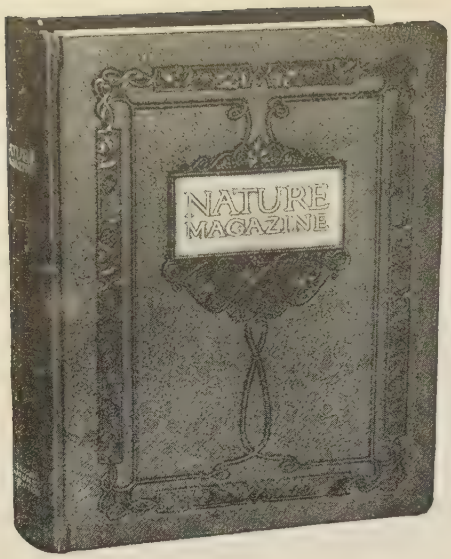
10 plants each of 4 varieties, 40 in all, for $5.

Our free catalog will be recognized by all nature lovers as being different. It features scores of different Ferns, Hardy Native Orchids and many other Wildflowers. We have the largest and choicest stocks of Laurel, Rhododendron, Azaleas, etc. etc. September—October is a splendid time to plant all we offer. Please write today, mentioning Nature Magazine

GILLETT'S

FERN & FLOWER FARM

7 MAIN STREET
SOUTHWICK MASS.



A New Binder for Nature Magazine

Every number of NATURE MAGAZINE is worth reading again and again. For your convenience and pleasure, we have secured an entirely new binder for copies.

Grasp this opportunity for greater enjoyment from your magazines—bind them in our special two-tone, hand colored cover, embossed in gold and they will be preserved to give you a lifetime of enjoyment.

Many requests make it possible for us to offer you these artistic, leather-like covers, pictured above, especially created for our members, in which you can insert each issue, as you receive it, in a half minute, without any punching or other annoyance to try your patience.

Each Binder Will Hold Twelve Issues and Is Guaranteed. Your Money Refunded If You Are Not More Than Pleased. $2.00 each

Your Name Stamped in Gold

If you want your name stamped in gold on the cover of your binder add 50 cents to regular price. Stamping will delay mailing of binder about two weeks.

American Nature Association
1214 Sixteenth St., N. W.
Washington, D. C.

MAIL THIS COUPON—PRINT PLAINLY

THE AMERICAN NATURE ASSOCIATION
Washington, D. C. Date.....

Send me.....distinctive covers for NATURE MAGAZINE, for which I enclose $.....
If I am not unusually pleased I will return them to you within 5 days, and my money will be refunded to me.

Name .....

Street .....

City and State.....

animals at ranges of over half a mile.

"And even now an extensive system of organized butchery is in progress which is being conducted in a manner so cruel that we should scarcely have regarded it as possible had we not received, confidentially, evidence which is conclusive and complete as we believe it to be trustworthy. It would almost seem as if, after one hundred years, the spirit of the great Chaka is abroad once more but without his unquestioned bravery and sense of justice, and retaining only his cruelty and lust for blood.

"The excuse for the slaughter is the same now as it was in 1920—the extermination of the tsetse fly. There are still some who profess or pretend to believe that a complete annihilation of the larger animals will be accompanied by the extermination of the tsetse fly and sleeping sickness although this is theory rather than established doctrine. And in Zululand an Advisory Board has been instituted which is apparently in control of these extensive killings. This board has issued official statements, and on occasions denials when the news of some particular acts of cruelty leaked out. Our information, however, is to the effect that such statements and denials are not in accordance with the real facts.

"The rare inyala, for example, is not spared, and one ex-magistrate distinguished himself by killing six females in one day. Native gunmen are hired and have orders to fire at any living wild animal irrespective of age or sex. These men have been stated to be 'tested marksmen'. Yet an actual eye-witness declares that twenty-seven shots were fired to kill three animals, and on another occasion twenty-four shots to kill two; in each case many beasts being wounded.

"We deny the necessity for this organized destruction of wild life, but even if it were necessary ordinary humanity demands quick and painless death rather than indiscriminate mutilation. We have forwarded all the information which we have received to the Society for the Preservation of the Fauna of the Empire, and feel sure that Lord Onslow and his Committee will leave no stone unturned in the exposure and stamping out of this evil in Zululand."

Camp Fire Girls

The Camp Fire Girls Councils of New York City are accommodating more than eight hundred girls in Harriman State Park, and have now three complete camping units, with mess halls, sleeping cabins and other buildings on Upper Cohasset Lake, on the western side of the Park, near Arden, New York. The girls, most of them city-bred, with little opportunity for out-door life, are being taught camp-craft, carpentry and conservation while at the camps. Under the leadership of Miss Jean Berger, they are also banding birds as one of the features of their Nature study. Nature museums and nature trails are maintained by the girls. This year, a new cabin was built for the older girls, and they did most of the interior decorating themselves, building bookcases and shelves, making benches and rustic racks and generally serving as carpenters and cabinet makers. The Camp Fire Girls maintain the largest camp of all the seventy organizations utilizing Harriman State Park, the mecca of yearly thousands.

FORESTS
AND
MANKIND

By
CHARLES LATHROP PACK
President of the American Tree Association
AND
TOM GILL
Forester

250 PAGES
64 ILLUSTRATIONS

. . . a book to read and read time and time again by those who seek knowledge of the importance of the forests in their historical, social and economic relations to mankind.

Just Off the Press
Price $3.00

Order from
AMERICAN
NATURE ASSOCIATION
WASHINGTON, D. C.

Rin-Tin-Tin is fed KEN-L-RATION exclusively. Like all other dogs Rin-Tin-Tin requires a **balanced** food—and Ken-L-Ration is perfectly **balanced**, containing meat, cereals, cod liver oil and charcoal in the right proportion.

Do not accept substitutes. Ken-L-Ration is for sale in more than 50,000 stores. Ask for it by name.

Send For FREE Sample

Chappel Bros., Inc.
1110 Peoples Avenue
Rockford, Illinois

KEN-L-RATION
THE DOG FOOD SUPREME

SCOTTISH TERRIERS

eautiful young stock
ow ready for delivery.
rice reasonable.
oganbrae Kennels
Rutland, Vt.

DOG CARE SIMPLIFIED

Get this new 32-page illustrated booklet that tells all about raising dogs—valuable for amateurs and professionals alike. Sent with crisp samples of Milnor's A-1 Dog Foods for 10c postpaid. Write today.

10¢

BATTLE CREEK DOG FOOD CO.
182 State Street BATTLE CREEK, MICH.

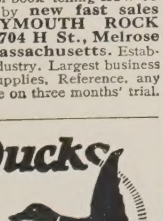
NOBLE
Newfoundland Puppies
A. K. C. Pedigree
Price reasonable
E. L. MOULTON, Woolwich, Maine

WHITE COLLIE pups, the most beautiful specimens the dog world can offer, useful and intelligent. Send for Catalogue.
Comrade Farm Kennels, Galion, Ohio

Squab Book FREE

PR squabs selling by millions to rich trade. Raised in 1 month. No mixing feed, no night labor, no young to attend. Sell for double chicken prices. Write at once for free 48-p. book telling how to breed and profit by new fast sales method. PLYMOUTH ROCK SQUAB CO., 704 H St., Melrose Highlands, Massachusetts. Established 29 years. Founder of the squab industry. Largest business in the world in pigeons and pigeon supplies. Reference, any. We ship breeding stock everywhere on three months' trial.

ttract Wild Ducks



other migratory water fowl
aters near you by planting
s they like. Special Septem-
prices. Giant Wild Rice seed,
ushel $8, delivered. Plants ¼
Complete list free.
RRELL'S AQUATIC FARMS
Blk, Oshkosh, Wisconsin

Some Like 'em Hot

Broiled insects are regular items on the bill of fare of the robins and blue jays at Yosemite National Park. Birds, it would seem, have sentries posted along the Wawona, Big Oak Flat and All-Year Road entrances to the park; these single out the machines whose radiators bear the greatest number of insects broiled alive when they struck the hot surfaces. The sentries dash back to the hungry multitudes, and as soon as the automobiles are parked in front of the National Park Service Administration Building, the feast begins. The birds are very careful, however, not to touch the radiators, but to remove the cooked meal from them and to deposit it on the ground until it has cooled. Even birds that are not early are catching the equivalent of worms these days.

Squirrel V. Rattlesnake

Which would you pick to win in a battle between a rattlesnake and a ground squirrel? Perhaps nine out of ten would select the reptile, but the tenth would choose the victor, if the struggle viewed by an Angola, Indiana business man was a representative contest. The snake, when first seen, was hurrying down a highway with the ground squirrel in pursuit. He almost got away in the grass when the rodent pounced on him, and dragged him back in the center of the road. Time after time the reptile tried to coil for a strike; and as equally often the squirrel seized his head and ran down his body, tearing and biting as he went. At least twice the snake got the little mammal in his coils, but could not hold him there. Finally the battle ended, the snake lay dead, and the rodent went off to his haunts by the roadside, with a black rattlesnake to his credit.

First Aid

How a crow saved his companion crow from strangulation is told by Violet E. Pflueger, of Crystal Lake, Illinois, in whose back yard the incident happened. Two crows were busily engaged in gulping the overripe fruit of a heavily laden cherry tree. One tried to swallow an extra large cherry, but it stuck in his throat and he could not dislodge it. He became frightened and squawked loudly and harshly. His companion heard and seemed to understand, for he immediately went over to the suffering bird, thrust his beak down the glutton's throat and drew out the obstacle. And then the feast resumed.

Hostess Peggy

Those who pantingly scale Half Dome, the giant monolith that towers 4937 feet above Yosemite Valley in Yosemite National Park, are greeted, these days, by Hostess Peggy, the little Sierra chickaree who for the past few summers has been the lone inhabitant of the thirteen acres of flat granite that form the top of this great rock. She perhaps lives in the lone tree that struggles in the rarefied air, depending on the crumbs of hikers' lunches for her food.

Taxidermy

Preserve your specimens of natural history. Let Jonas Bros. mount them true to nature. Mounted Mammal and Bird Groups, Trophies, Fur Rugs, etc., for institutions and individuals.

Send for illustrated booklet, "Art in Taxidermy."

Master Taxidermists

1023 Broadway JONAS BROS. Denver Colorado

"Ask the bird that owns one."
Packard Best-of-All Bluebird Houses
6 for $5. Why pay more?
Best looking, longest lasting, and the birds love them! Prices advance soon. Buy now. Save money and save birds.
Everything for Wild Birds, catalogue free.
WINTHROP PACKARD
1433 Washington St. Canton, Mass.

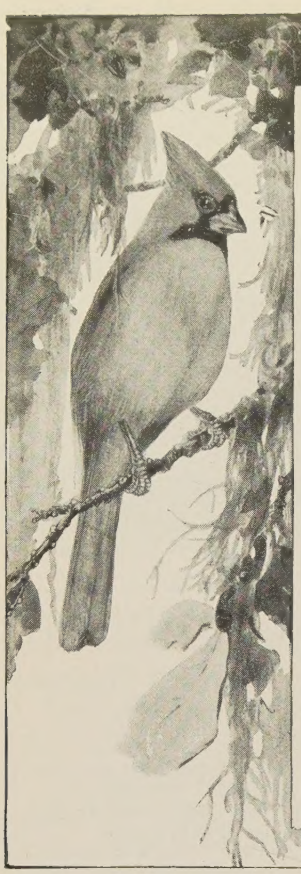
BEAUTIFUL BIRDS
Direct from the Breeder
5 Pairs Assorted for $15.00
1 Pr. Green Parakeets . . . $5.00
1 Pr. Strawberry Finches . . 4.00
1 Pr. Java Rice Birds . . . 4.00
2 Pr. Zebra Finches 7.00
ACTUAL VALUE $20.00
All 5 pairs shipped safely to you by Express for Special Price of $15
BEAUTIFUL CANARY SINGERS . . . $6
Send P. O. Money Order with your order.
Send for BIG ILLUSTRATED PRICE LIST-FREE to Bird Lovers
BIRD HAVEN, P. O. Box 31, RESEDA, CALIF.

3 Rustic Cedar Bird Houses for $5.00 & Post Charges
Weight 10 lbs.
CRESCENT CO., Toms River, N. J.

SHELLS Send one dollar for box of Florida sea shells or send two dollars for a stuffed or live alligator.
GIFT & PHOTO SHOP
P. O. Box 1958 Fort Myers, Florida
Correspondence from Collectors Solicited

FREE RADIO CATALOG
168 PAGE BOOK OF BARGAINS—
168 pages of radio bargains. New 1931 Screen Grid, all-electric, A. C. Sets in beautiful Consoles—also battery operated sets. Write today.
ALLIED RADIO CORPORATION
711 W. LAKE ST. DEPT. 93 CHICAGO

CHRISTMAS CARDS FOR HAND COLORING
UNUSUAL DESIGNS BY LEADING ARTISTS
25 Charming Christmas cards with envelopes to match. All different. $1.00
55 Special Christmas cards with envelopes to match. All different. $2.00
Such cards should sell for 10 cents each and up when colored. Many are earning extra Christmas money doing it. Send for assortment now.
Canterbury Art Guild, 755 Boylston St., Boston, Mass.
An international organization of artists and craftsmen.
Catalogue No. 19 showing many designs on request.



Membership Nomination Blank

AMERICAN NATURE ASSOCIATION
WASHINGTON, D. C.

.....1930

Secretary, AMERICAN NATURE ASSOCIATION,
1214 16th St., N. W., Washington, D. C.

I nominate for subscribing membership in the Association and to receive NATURE MAGAZINE:

Name.....

Address.....

NAME AND ADDRESS OF NOMINATING MEMBER

.....

.....

ANNUAL DUES	
United States	$3.00 a year
Abroad	$4.00 a year

90% of the annual dues is designated for subscription to the magazine

Secondary Mathematics

A text mainly for the teachers of mathematics, to give them the proper background for their teaching, has been prepared under the title of *The Teaching of Secondary Mathematics* by Jasper O. Hassler and Rolland R. Smith, and published by the Macmillan Company. The work traces the history of mathematics, explains the derivation of the fundamental concepts, and lays out before the teacher the modern tendencies, aims and methods of presenting the subject to the pupil. It is rich in suggestions and ideas, and any person who has steeped himself in it should be much better able to make the oldest of the sciences a vital, dramatic study rather than a drab bore. The book is priced at $2.50.

Memorial to Bird Man

The Indiana Audubon Society is raising funds among its members and friends to erect a memorial at the grave of the late Isaac Washington Brown, popularly known to thousands in the United States as "The Bird and Bee Man." He died sixteen years ago after a life filled with activity in the interests of birds and animals. His lectures are still remembered by those who years ago, as Indiana school children, listened to him, and his name is familiar to those who were on the route of his numerous lecture tours around the United States. Dr. Earl Brooks, President of the Indiana Audubon Society, Noblesville, Indiana, is in charge of the collection of the memorial fund.

INDEX TO ADVERTISERS IN SEPTEMBER ISSUE

BINOCULARS

Bausch & Lomb Optical Co. 135
Du Maurier Co. 136
Loring, J. A. 136
Wollensak Optical Co. 136

BIRD HOUSES

Crescent Co. 199
Packard, Winthrop 199

BOOKS

Audel, Theo. 195
Bound Volumes 196
Forests & Mankind 198
Hygeia 138
Nature Binder 198
Plymouth Rock Squab Co. 199
Van Nostrand Co. 138

EDUCATIONAL

American Landscape School 137
American School of Photography . . . 137
Calvert School 137
Federal School of Commercial Designing . 137
University of Chicago 137

GIFTS

Gift & Photo Shop 199

GARDEN AND ACCESSORIES

Ackermann, F. B. 136
Aiken, George D. 196
Allan, James 193
Aquaproof Products Co. 193
Burpee, W. Atlee, Co. 193
Childs Seed Co., John Lewis 193
Gillett's Fern & Flower Farm 197
Maule, Wm. H. 197
Oronogo Flower Gardens 195
Peterson, George H. Inc. 191
Pfeiffer Nursery 195
Rosedale Nurseries 193
Scott, O. M. & Sons 193
Shumway, R. H. 195
Stumpp & Walter Co. 191
Terrell's Aquatic Farms 199
Wayside Gardens 193
Western Maine Forest Nursery 197
Wilson, Andrew, Inc. 197
Wohlert, A. E. 193

HOTELS

Statler Hotel 13

KENNELS

Battle Creek Dog Food Co. 19
Chappel Brothers, Inc. 19
Comrade Farm Kennels 19
Loganbrae Kennels 19
Newfoundland Puppies 19

MISCELLANEOUS

Allied Radio Corporation 19
Bird Haven 19
Canterbury Art Guild 19
Woods Mfg. Co. 13

PHOTOGRAPHIC

Folmer Graflex 13

TAXIDERMY

Jonas Brothers 19

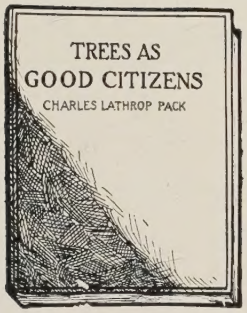
TRAVEL

South Africa Travel Bureau 13

THESE BOOKS BELONG IN YOUR LIBRARY

Trees as Good Citizens

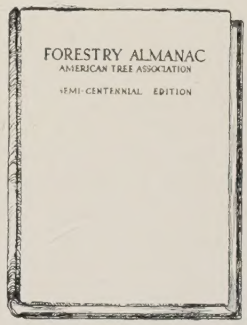
Price $4.00



SPREADING their shade and foliage like a great triumphal arch, trees are essential to every American home. This book, containing 16 beautiful color plates, tells you all about the shade trees. Ideal for the home owner. Cloth bound with gilt lettering.

Forestry Almanac

Price $1.00



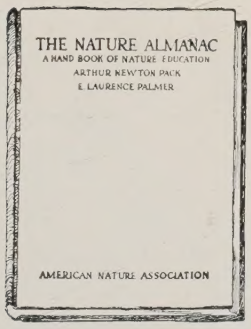
390 pages of complete information about forestry organizations, national, state and local, with facts and figures upon forestry conditions in all countries.

Published to aid schools, libraries, newspapers, foresters, lumbermen and others to have pertinent forestry information in condensed form. The only book of its kind in America. Sold at less than the printing cost.

The Nature Almanac

New Edition Ready Oct. 1—1930

Price $1.00



A Handbook of Nature Education. The first Nature Almanac ever compiled. It is of great practical service to Educators. Contains a Nature Education Survey of the United States, a School Nature Outline, a Practical Nature Bibliography and many other Features.

Order from

The American Nature Association

Washington, D. C.

CARL VAN DOREN,
EDITOR-IN-CHIEF

A year's subscription to "Wings" FREE with your membership in the LITERARY GUILD

JULIA PETERKIN

BURTON RASCOE

GUILD BOOKS are *triple* bargains to members of the Literary Guild.

(1) Guild members save half of what thousands of other people pay. (2) The books have a special Guild binding, always handsome, sturdy and in a format which distinguishes them from the regular retail editions. (3) With each book is included at no extra cost, an attractive book magazine, WINGS.

WINGS is not sold to the public—it is exclusively for Guild Members. WINGS brings you into intimate, informal association with book folks. There are articles on books and on reading by Guild Editors, Guild authors and other well-known writers and critics. In a regular department are reviews of new books which the Guild Editors especially recommend.

In addition to being interesting in itself, WINGS adds to your enjoyment of the current Guild selection. In a monthly article, Carl Van Doren gives an appraisal of the book and the Editorial Board's reasons for singling it out from all the hundreds being published. A biographical and character sketch makes you acquainted with the author. In a special message to Guild members, the author gives an informal account of the writing of the book.

Membership is Free

It costs you nothing to belong to this great literary movement, to receive all the special privileges of Guild membership. The Editorial Board of Carl Van Doren, assisted by Julia Peterkin, Joseph Wood Krutch and Burton Rascoe selects one outstanding new book each month from the manuscripts submitted by the leading Publishers.

As a Guild member, you are among the very first to read the book. Yours is the joy of discovery. You partake of a rare literary treat weeks before the book is heralded and discussed everywhere.

How This Value Is Made Possible

It is only because there are so many members that the Guild is able to render so many free services and in addition deliver the best new books at one half the usual cost. The savings effected by quantity buying are passed on to Guild members in the form of extra services, better than usual quality in printing, binding, etc., and drastically lower prices.

Why Not Share These Advantages?

Since Guild selections are books you want, why not get them as a Guild member—delivered to you when fresh off the press—at half price—in the distinctive Guild binding—with the entertaining and instructive magazine WINGS.

Get full details today! Mail the coupon for an interesting booklet "Make the Literary Guild Serve You." Find out how this great literary organization can save you money and add to your reading pleasures.

THE LITERARY GUILD, Dept. 14-N.M.
55 Fifth Avenue, New York, N. Y.

Without cost or obligation on my part, kindly send me your booklet *Make the Literary Guild Serve You.*

Name .....

Address .....

City ..... *State* .....

THE LITERARY GUILD

55 Fifth Ave., Dept. 14-N.M. New York, N.Y.

Canadian Representative: McAinsh & Co., Ltd., 60 Front Street, W., Toronto, Canada

GUILD Selections for last 12 Months

JULY, 1930
Wooden Swords
by Jacques Deval

JUNE, 1930
The Adams Family
by James Truslow Adams

MAY, 1930
Hot Countries
by Alex Waugh

APRIL, 1930
Bystander
by Maxim Gorki

MARCH, 1930
The Great Meadow
by Elizabeth Madox Roberts

FEBRUARY, 1930
The Human Mind
by Dr. Karl Menninger

JANUARY, 1930
Coronet
by Manuel Komroff

DECEMBER, 1929
Candide-Voltaire
Illus. by Rockwell Kent

NOVEMBER, 1929
Laughing Boy
by Oliver La Forge

OCTOBER, 1929
Queen Elizabeth
by Katherine Anthony

SEPTEMBER, 1929
The Tragic Era
by Claude G. Bowers

AUGUST, 1929
They Stooped to Folly
by Ellen Glasgow